

portrait of the guppy





Testimonial

To

Lawrence König

For his outstanding contribution in the advancement of the Aquarium Hobby throughout the world, the *Northeast Council of Aquarium Societies* presents this scroll of appreciation.

Lawrence König has unselfishly contributed his time and breeding stock for the pleasure and education of hobbyists all over the world. He has encouraged, educated, instructed and assisted both individual hobbyists and organized clubs and societies of hobbyists in the pursuit of their mutual interests.

It is, therefore, the wish and desire of this Council to acknowledge and proclaim Lawrence König to be the man who has done the most for the Tropical Fish Hobby, the

Man of the Year - 1957 - 1958

The Northeast Council
of
Aquarium Societies

John Harris

PORTRAIT OF THE GUPPY
BY LARRY KONIG

Published By E.G. Publishing Co.
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E.G. Publishing Co. P.O. Box 294
Elizabeth, N.J. 07207
ART & LAYOUT by ALFRED N. KONIG
Printed In The U.S.A By The
Lithograph Process By
J. SCHILLER, INC. Linden, N.J. U.S.A.

PREFACE

PORTRAIT OF THE GUPPY

To fill the needs of the beginner as well as the advanced breeder of Guppies, Larry Konig has compiled in simple, nontechnical, easy to understand terms, the "Portrait of the Guppy". Over 100 pages containing chapters on breeding by visual control, aquarium set up, water and tank conditions, aeration and filtration, also feeding, lighting, and heating and many more chapters that can be recommended to the new hobbyist for the information needed for the care and welfare of all live bearing Tropical Fish.

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PORTRAIT of the GUPPY

Little do people realize as they casually pass an aquarium, set up in the home of a friend or in some public place the changes that have been effected in the lives of thousands of people that have stopped for a second look. I seldom felt impelled to look twice. One day, sixteen years ago, a friend presented my son with a gallon jug containing four guppies.

My son took off for the store for a can of fish food. The next day the jar held cloudy water, the third day two fish were dead. Quickly to the pet shop, what's wrong? Our tank is too small, a larger tank is purchased, by then only one fish is left. The next step to obtain some literature on the care of tropical fish.

At that time no specific literature on the guppy. As we read a booklet on Tropical Fish care, a new world was opened for us. Who ever heard of a sick fish or treating same, water conditions, types and P.H.. Dozens of plants were pictured for aquariums, accessories and equipment of all kinds were ours to see and ponder.

Several weeks passed, our tank was passive and more guppies had been added, the fish book digested, now we were ready to talk guppies to anyone who would stop to listen. Joining an Aquarium Society made new friends and additional data absorbed, to help care for our fishes, learned of live food that could be collected from local ponds, also of dangerous parasites and/or their eggs that could come with these foods for unknowing introduction into our tank.

In those days the guppy was considered a fish for the beginner as a first step to the more exotic tropical fish. Before this came to happen to me, a memorable trip to Charles Watt's Pet Shop in Elizabeth, New Jersey, caused me to become a confirmed guppy raiser. In a tank of guppies from Florida, I saw an outstanding male. He had a perfect black triangle shaped tail at least three times larger than any guppy tail I had seen since I started with guppies the year before. I bought this guppy for the grand sum of thirty five cents and with the thought in mind, "How could I get more like the good fish I had."

This led to five years of experiments in breeding guppies. In 1957, I wrote an article for the "Aquarium Magazine" on some of the results from my experiments. Thousands of letters were received and they have poured in ever

since. The letters were from school children, teachers, biologists, servicemen (from privates to colonels), physicians, clergymen, medical men, laborers, housewives, patients in hospitals, old and infirm; indeed, the letters came from all over the world. The guppy had become the most popular of all aquarium fishes.

In schools, guppy tanks were set up as visual aids in science and biology. The therapeutic values of fish tanks, set up in hospitals have been proven in countless cases.

In my opinion, every home with children, should contain a small tank of guppies, because it is one of the easiest and least embarrassing ways to teach the children about the facts of living reproduction. Perhaps, right in your own home is a future Biology Teacher, Chemist, Ichthyologist or even a future professional fish breeder. One can always be sure that a small tank set up in the house is a constant and unending source of information for our children, when after, they take a first good look into the fish tank and turn saying, "Mommy or Daddy -- why?"

I have read many articles giving credit to "Lechmere Guppy, Esq., Trinidad", as having brought the first specimen of the guppy which he had found in Venezuela in about 1866, to the attention of Ichthyologist in England. These fishes were finally scientifically named *Lebistes Reticulatus*. The name Guppy became fixed in the public mind and is now the universal and probably the permanent and most widely used name in our Aquarium Hobby.

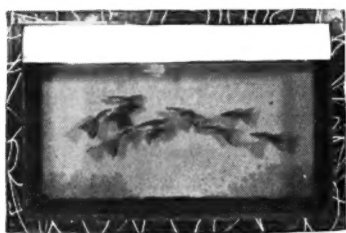
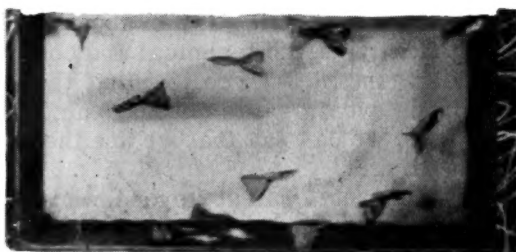
In the late 1940's and the early 1950's, the common guppies did not create too much of a stir and there was no competition or practically no entries of guppies at the aquarium shows held at that time. If there were a dozen guppies entered in any show, that was considered a lot. There were a few stubborn breeders who did enter guppies in the local metropolitan area shows. In late 1950 and through 1951, two types of guppy forms began to attract the attention of the public at the fish exhibitions. One form was called the "Veil tail" guppy which was a fairly wide tail and large bodied fish, and the other form was the "Triangle Tail" guppy that was smaller in body than the veil tail, less colorful, but did in most exhibitions have more tail finnage area than the veil tail.

There is no doubt that there were many people keeping guppies due to the fact they were easy to breed and to keep alive, and their ability to accept nearly any aquarium conditions, plus being low in price, but they were still common guppies. So, when our American large tail guppies did begin to appear in shows and occasionally in dealer's stock,

the experienced aquarists came to with a jolt. Here were guppies that were half to three quarters larger in body than the guppies they had seen and raised to date, plus the fact, that tail finnage was two to three times larger, certainly generated considerable interest and curiosity. The average price of a pair of these guppies at that time was twenty dollars a pair. That is, when and if they were available and that was seldom.



KONIG
DELTA
TAIL
GUPPIES-1951



In 1952, a book on guppies was published that contained pictures of male guppies (drawn from life) that to many of us was absolutely breathtakingly beautiful. There were pictures of the Albino, Scarf tails, Leopard, Bottom sword tail, Scissor tail, Betta tail and last but not least Veil tail. These fish had been drawn in colors and the forms were exquisite in every detail.

The guppies that were being developed by all of us in those days were pallid in comparison to these pictured guppies. The guppy book enjoys a good circulation to this day, and we enjoyed a good year or two of searching in our attempt to locate the strains that could have been the models used by the artist to draw these fishes. It was a common occurrence to travel many miles to track down rumors that indicated these strains could be seen here or there. Well, it was a lot of fun looking and it also became apparent that the only strains around in our national aquarium hobby that could remotely compare to these by now, famous pictured fishes were here in our New York City area in our own tanks. Bear in mind, we were looking for strains not one or two of a kind, occasionally one or two fish would show up in our tanks or at exhibitions that were almost comparable to the strains we sought, but never enough to go around and so we had to work out our own method or try to discover how to further develop our guppies to more brilliant colors and larger finnage.

The books to date written about guppies tend to deal too scientifically in the technical and complicated terms of the Mendel Principle. I realize that the Mendel Principle is used by us even if we do not recognize this fact consciously. Of course, we can say that we use the principle unknowingly or unwittingly.

I have yet to meet anyone who could draw me a chart on the Mendel Principle of inheritance that if I followed it could cause all my tanks to be host to only show stock and prize winners. If it were possible then any guppy sold or exchanged around the country today would have to be a show stopper and so culls and guppies that are not in the fancy guppy class would long since have become a part of the past. Let me assure you that you need not be an acknowledged expert or renowned authority to be able to raise your share of show guppies. Even though our large finned guppies are a special type, they had to descend from the original wild type guppy originating in Venezuela and Trinidad. To see a wild type male today round tailed, small and in the average less colorful compared to our present day wonders could cause many to ask "These are related?"

In their natural state there would be or is an occasional male that appears with exceptional bright colors or with larger Dorsal or tail fins and these mutant characteristics are transmitted to many of his sons. Under uncontrolled natural conditions, these mutant tails will soon be lost. The fish that carry these mutation genes mate with their common relative guppies whose natural genes gradually wash out the abnormal mutations.

In our own fish tanks when mutations appear, we have the opportunity to exercise an unnatural control that often helps the mutant genes hold their own and continue to appear in each succeeding generation.

In the early days of my experiments in trying to raise large tail guppies from 1949-1954. The good males had mostly triangle shaped tails (Delta). If one male in fifty developed a good delta shape, I was doing well. The only reason I had enough (barely) of these type of fish to show or sell was due to having over one hundred tanks devoted entirely to guppies. It often happened that even with all these tanks there would not be more than forty or fifty good male guppies among the thousands in my fish house. This makes the point that our fancy guppies are unnatural mutations, having larger finnage than ordinarily provided by nature and to maintain these characteristics is against nature's wishes. Since we work to breed fancy guppies from mutations it is necessary to maintain constant observation of our breeding fishes. If we tend to become lax, then nature is always on hand to help our mutations revert back to their normal forms. Even so in many cases they are likely to do just this.

In 1954, I was fortunate to meet Dr. John Rutkowski of Trenton, New Jersey, who was raising some very good large veil tail guppies. We agreed to pool our knowledge and stock of guppies. We decided to try to develop a certain set strain. We studied many possible angles on heredity that might be practical in helping to develop the "blue ribbon" fish we were looking for. As these experiments went on, we became increasingly aware of one factor which we called the "X Factor", meaning, which females in that spawn had the genes to carry on the strain -- maybe one, maybe all or maybe none. When these fine fish were left together some good fish did come from them. Also at the same time the little male fishes that were born from the females that did not have the genes to carry on our strains, were swimming around and busily working away helping nature to get back her own.

In order to properly observe the development, it then became a must to separate the female fish and wait to see what their offsprings would look like. The females and their young that lacked the points we sought were discarded.

Dr. Rutkowski and I had found that observation is the only way to control the number of unwanted fishes from cluttering up our tanks. At that time we recognized our good females as having the characteristic of a large tail with a slight protruded tip on the top part of the tail.

The largest tails we managed to raise tended to be mostly black and a few were blue. Results of breeding between brother and sister was generally as good as the father to daughter breedings. We also established that all inbreeding would cause the line to degenerate to the point of leaving us with no really good males for breeding purposes. So then the inbreeding was carried down to only the third or fourth generation and from there outbreeding to another good recognized strain was carried on.

This then made us realize, if the well known and successful breeders of that time would not be so secretive and exchange their findings and fishes with other guppy breeders, it would mean that a much larger supply of big tail fancy guppies would be available and so would help our big tails in their struggle against nature.

Those that were not willing to do this, did breed their strains right out of the prize winning circle.

In those days of \$20.00 a pair guppies, many guppy rooms did spring up in our N.Y. Metropolitan area and many people had the vision of practically instant money.

They thought that all they had to do was to acquire two or three pair of the breeders best guppies, take them home and sell the offsprings for the same price that they paid for the parents. Well, we certainly lost a lot of would be guppy breeders that way.

Of course the fact that many of the breeders would claim that their stock would always breed true, did help many of the new guppy enthusiasts part more easily with their money. In the largest majority, the resulting young from this early breeding stock would in no way compare to the male that had supposedly been the father, of course, you can bear in mind that the male could also have been the father of these poor young.

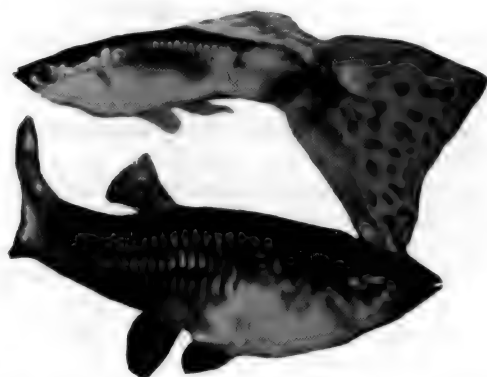
As the poor results, which were the reward for many of the guppy breeders who had bought the best, became known to our Metropolitan area breeders, there was a noticeable drop in guppy interest and exhibition, and there were only about a half dozen persons showing guppies at our aquarium shows.

But the big tail guppies that did continue to show up, caused interest to be rekindled. One of the problems that had to be overcome in those early days was the fact that there were no set guppy standards, and judges used their own personal rules and prejudices when they officiated. I can recall a judge standing under a sign that read "First Annual Fancy Guppy Show". When questioned why a guppy with only half the tail spread of some of the other entries

was chosen as "Best of Shows", the answer was "Those other tails are so big, they are not natural anymore!"

I can remember causing laughter at a meeting which was being attended by at least seventy five people, because Dr. Rutkowski and I wanted to make the aquarium hobby conscious of the fact that there was such a thing as a really big tailed guppy strain that could be bred to maintain the "Triangle" shaped tail on the males.

It was our opinion that the best way to stimulate interest in the triangle shape tail would be to give some of our best stock free to groups that would be interested in trying to maintain a strain of big tail guppies. At the same time we thought this move on our part would cause discussion on the subject of forming guppy standards and points for judging same.



Type of Rutkowski-Konig guppies distributed to
A.G.A. groups 1957-59

If this would come to pass, then we knew that the incentive would be there, to cause the interested hobbyist to work hard to keep the big tail guppy strain alive.

HISTORY of the A. G. A.

In 1957, the publishers of five Aquarium magazines were asked if they would like to sponsor the formation of the "American Guppy Association", by donating space for a monthly column. The response was a big first in our "Aquarium Hobby". This was the first time that any association was ever favored with so much cooperation by more than one publisher. They all agreed to carry the A. G. A. news release as a monthly feature. I had the privilege of writing this column for six years.

There is no doubt in my mind that the publisher through their unselfish and free donation of this space, did more to help develop the first accepted, "International Standard" for judging the guppy, than I can possibly credit to them in this book.

You can well imagine why the guppy movement grew so large and successful with this space available in each publication monthly.

The column also helped to make me the happy recipient of many invitations to talk on guppies in many States and Canada. If there was a group east of the Mississippi willing to listen and talk guppies in those six hectic years it seems I was there.

Each publication received exactly the same material each month. As the news of the activities of the "New York and New Jersey Guppy Breeders" began to circulate around the country through this donated space, the letters from the interested hobbyists began to pour in.

The founders of the A. G. A. were more interested in the already established groups (The Aquarium Societies).

In order to stimulate interest in the established societies, Dr. John Rutkowski and myself, offered a free pair of big tail guppies from good breeding stock to every Society that would form an A. G. A. group from among it's members. By the time the offer had expired, more than two hundred and fifty pair of good breeding stock had been distributed.

As the offsprings of these fishes began to circulate, interest continued to grow and so did the guppy sections of the various fish shows held around the country. It finally came to pass that the guppies became the most popular fish in the show, not only for the breeder, but also for the spectators.

The American Guppy Association monthly news release, did carry the names and addresses of all persons who had good guppy stock available. This also helped to stimulate interest, as time went on more good stock was donated by Henry Kaufman, Phil Scala, Lewis Rexford, and Arnold Sweeney to newly formed A. G. A. groups.

There was one real flaw in this picture, there was no accepted standard or method for judging these fishes. The next order of business for the A. G. A. was to establish a standards and point system for judging our type of the "American Fancy Big Tail Guppies."

This was finally accomplished and we now have a method and official point system that can be used to judge any type of guppy from the "English Pin Tail to our American Delta Tail," and also any type of female guppies.

All that a qualified judge needs to know is what the accepted "Ideal" form of the fish should be. Then with the aid of the A. G. A. standards and point system He or She are able to judge the guppies.

These standards have been used to judge guppies at the majority of the guppy exhibitions held in the past four years.

The valuable services rendered to the guppy movement in our hobby by the Aquarium Magazine, All Pets, The Aquarium Journal, Pet Life, Tropicals and T. F. H. Magazine and Aquatic Life have earned our most sincere thanks.

A. G. A. Standards are Work of Many

Excerpt from a 1961 A. G. A. News Release Background on Standards Work

In the past two years, many pleas were made to the A. G. A. membership for their ideas on "Fancy Guppy Standards." There were a few individual replies and several A. G. A. groups sent in standards that they had worked out for their own use. There were not enough however, so in order to get a picture of a larger segment of the Aquarium Hobby I turned to The Northeast Council of Aquarium Societies. This is the most closely knit, most constructive and most helpful association of "Fish Clubs" I have come in contact with in all of my travels. Because there are more than 14 societies in the "Council," I was sure that they could come up with Guppy Standards that would be acceptable to the A. G. A. membership and all other groups that hold Guppy Shows. William Cannon, Avon, Mass.; and Roy Kennan, Green Harbor, Mass., in spite of all their other work in

running the "Council" school of judging, helped greatly on these Standards. They did spend many hours on this project and will receive every recognition that we in the A.G.A. can give them. Each will be presented with the A.G.A. Plaque, properly inscribed for their efforts to further the work and aims of the American Guppy Association and the hobby in general.

Now that we have these standards to print, I know there will be critical comments received. So long as these comments are constructive, fine. In time when enough are received, then there might be reason to make needed changes, due to a new found majority opinion.

A little over a year after the above was printed, The A.G.A. Guppy standards received a tremendous lift from "The International Federation of Aquarium Societies" as per the following letter.

THE INTERNATIONAL FEDERATION
OF AQUARIUM SOCIETIES

May 22, 1963
Box 116
Cornucopia,
Wisconsin

Mr. Lawrence Konig,
Ex. Secty., A.G.A.
824 Rebecca Place,
Elizabeth, N. J.

Dear Larry;

This letter will inform you that the Policy Committee of Tifas submitted a resolution to the board at the Milwaukee Convention to adopt the A.G.A. rules and standards for our member clubs.

The resolution was passed by the members present and is now an official set of standards and point system for the use of the Tifas member Clubs.

Thanking you for your opinion that if at some future time we feel changes are necessary, you will be glad to meet with members and work these out.

Sincerely,
Clayton B. Howk
Secty. Tifas



DELTA

A.G.A. FANCY GUPPY STANDARDS

The Guppy has come a long way, by means of mutations and selective breeding, from the wild type *Lebistes reticulatus* found in Trinidad and Venezuela. As a result of extensive and highly competitive exhibitions of the improved varieties, much controversy has arisen over just what exactly is a Fancy Guppy. The following are the standards of the American Guppy Association for the three most widely exhibited, and therefore most controversial, types of Fancy Guppy.

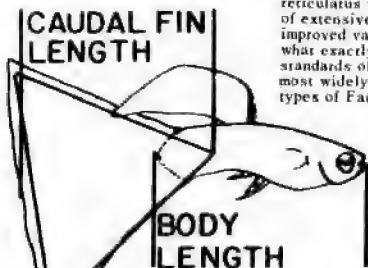


FIGURE 1. This figure shows the method used in measuring the length of the body and the caudal fin to obtain proportions.

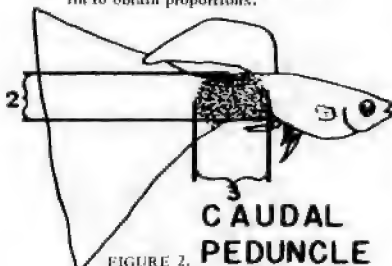


FIGURE 2. This figure shows the caudal peduncle, or tail, and its proportions.

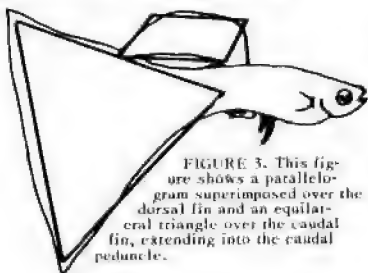


FIGURE 3. This figure shows a parallelogram superimposed over the dorsal fin and an equilateral triangle over the caudal fin, extending into the caudal peduncle.

THE DELTA TAIL GUPPY

This type of guppy is thought by many to be the ultimate achievement in Guppy breeding. Many fishes are shown each year that are placed in the Delta Tail class, and although many approach the following standard, few if any equal it in all respects. It is important to bear in mind when reading this and the following standards that the illustration shows an ideal fish, and that the word description is concerned with proportions and not size. It is usual to see male Guppies from one and one-half to two inches in length exhibited today, while the wild type seldom, if ever, exceeded one inch in length.

BODY - The proportions of the body to the caudal fin shall be in the ratio of 1:1 (See Figure 1). The ratio of length to depth of the caudal peduncle shall be 3 to 2, that is to say, strong enough to carry the caudal fin (See Figure 2). The body must be well-rounded and neither hump-backed nor flat-headed.

DORSAL FIN - The dorsal fin shall approximate a parallelogram (See Figure 3). The ratio of length to depth of this fin shall be 2 to 1. The posterior margin is seldom even; it is usually fringed.

CAUDAL FIN - The caudal fin shall approximate an equilateral triangle (See Figure 3). The posterior margin of this fin should be even. Very few mature male Guppies display an even margin; most are fringed, scalloped, or frayed. In addition, nearly all Delta Tails have rounded corners. This fin must be spread and carried erect at all times.

COLOR - Both dorsal and caudal fins should be entirely colored, with color in at least half of the body itself. Some strains show color in the pectoral and anal fins, but the pelvic fins are seldom, if ever, colored.

THESE STANDARDS CORRECTED AS OF AUGUST 1, 1965



VEIL

THE VEIL TAIL GUPPY

This tail type was considered to be the last word in caudal fin development twenty years ago; today too many of the entries in this class are culled from Delta Tail strains. Most of these fishes exceed the width requirements for a Veil Tail and cause much controversy as to



whether they are superior Veil Tails or poor Delta Tails.

It has been suggested that the name "Veil Tail" be dropped in favor of "Wide Tail". The members of the Standards committee feel that Wide Tail would be equally applicable to Veil and Delta Tail types and therefore is not an acceptable name.

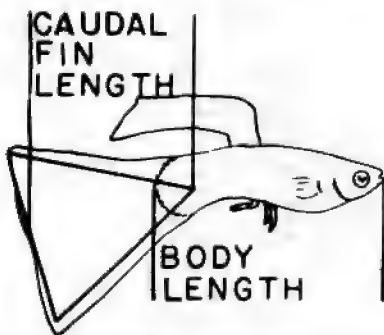


FIGURE 4. This figure shows the method used in measuring the length of the body and the caudal fin to obtain proportions.

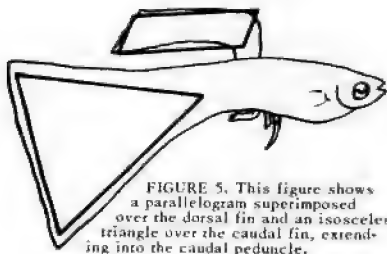


FIGURE 5. This figure shows a parallelogram superimposed over the dorsal fin and an isosceles triangle over the caudal fin, extending into the caudal peduncle.

BODY - The proportions of the body to the caudal fin shall be in the ratio of 5:4 (See Figure 4).

The ratio of length to depth of the caudal peduncle shall be 3 to 2; that is, strong enough to carry the caudal fin (See Figure 2).

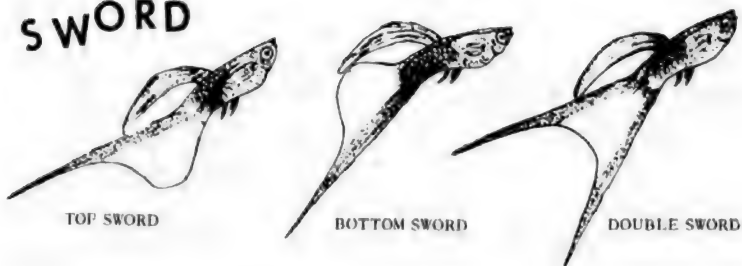
The body must be well-rounded and neither hump-backed nor flat-headed.

DORSAL FIN - The dorsal fin shall approximate a parallelogram (See Figure 5). The ratio of length to depth of this fin shall be 3 to 1. The posterior margin is seldom even; it is usually fringed.

CAUDAL FIN - The caudal fin shall approximate an isosceles triangle (See Figure 5). The posterior margin of this fin should be even. Very few mature male Guppies display an even margin; most are fringed, scalloped, or frayed. In addition, nearly all Veil Tails have rounded corners. This fin must be spread and carried erect at all times.

COLOR - Both dorsal and caudal fins should be entirely colored, with color in at least half of the body itself. Some strains show color in the pectoral and anal fins, but the pelvic fins are seldom, if ever, colored.

SWORD



SWORD TAIL GUPPIES

Prior to the development of the Veil and Delta Tail types, the various Sword Tail types were very popular with Guppy breeders. Although they have fallen off sharply in popularity since the advent of the wider tail types, they still rank far ahead of the many other tail types that have been exhibited.

Here again, many of the Sword Tail Guppies exhibited are culls from Delta Tail strains; they tend to have club-shaped rather than sword-shaped caudal fin ray extensions.

BODY - The proportions of the body to the caudal fin shall be in the ratio of at least 2 to 3, and preferably 1 to 2 (See Figure 6).

The ratio of the length to the depth of the caudal peduncle shall be 3 to 2; that is, strong enough to carry the caudal fin (See Figure 2).

The body must be well-rounded and neither hump-backed nor flat-headed.

DORSAL FIN - The dorsal fin shall be long and narrow, extending well beyond the caudal peduncle. The ratio of length to depth of this fin shall be 5 to 1. The posterior margin is seldom even; it is usually fringed.

CAUDAL FIN - TOP SWORD
The upper rays of the caudal fin shall be elongated into a sword-like extension.

CAUDAL FIN - BOTTOM SWORD
The lower rays of the caudal fin shall be elongated into a sword-like extension.

CAUDAL FIN - DOUBLE SWORD
Both the upper and lower rays of the caudal fin shall be elongated into sword-like extensions of equal length.

On all Sword Tail types the fin ray extensions are usually club-shaped rather than sword-shaped. Breeders should strive to attain an evenly tapered sword-shaped caudal fin ray extension.

COLOR - The dorsal fin for all Sword Tail types must be colored entirely. The caudal fin is usually clear except for the extended rays, but may be entirely colored. Some strains show color in the pectoral and anal fins, but the pelvic fins are seldom, if ever, colored.

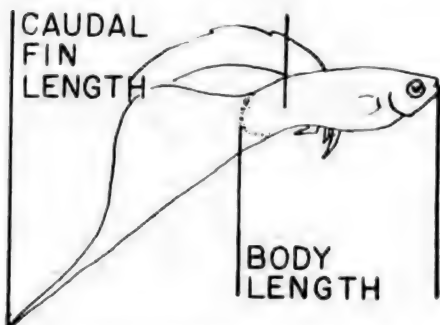


FIGURE 6. This figure shows the method used in measuring the length of the body and the caudal fin to obtain proportions.

THESE STANDARDS CORRECTED AS OF AUGUST 1, 1965

OTHER TAIL TYPES

Many other Guppy tail types exist, but the American Guppy Association experience has shown that those types standardized in this material are by far the most popular in this country. In exhibiting Guppies the Open Class will allow for all other types that may be shown and judged.

FEMALES



FEMALE GUPIES

Female Guppies are much larger and less colorful than male Guppies. Many varieties of female Guppies exist, but as they are not judged under existing American Guppy Association rules, no standards have been set for them at this time. The following outline could be expanded into a set of standards if the need were to arise.

BODY - The body of the mature female Guppy is larger than the male. The proportions are 6 to 5 in overall length and approximately 3 to 2 in volume.

DORSAL - The dorsal fin of most female Guppies is small and rounded, although some strains show elongated dorsals.

CAUDAL FIN - The caudal fin of most female Guppies falls into three main types, as shown by the figures on this page. These tail types are not necessarily indicative of the caudal fin type of males from that strain, i.e., round-tailed females occur in many Delta Tail strains.

COLOR - Females Guppies may or may not show color in the dorsal and caudal fins, or elsewhere on the body and other fins. The color shown is not necessarily indicative of the color of the males of that strain.

COLOR STRAINS

Color Strains refers to the back-ground color of the body of the Guppy. The three main Color Strains are:

GREY - The color of the wild type Guppy;
GOLD - a mutant color, almost butter-yellow;

ALBINO - true albino, with pink eyes.
An Open class for color strains will include blonde, bronze, etc.

COLOR VARIETIES

Color Varieties refers to the color of the caudal fin of the male Guppy. In all cases except Multicolor the color should be pure, and usually extends well into the body and into the dorsal fin. The recognized color varieties are:

Blue,
Black,
Red,
Green,
Multicolor.

All colors occur in various shades, with preference usually being given to the most intense shade shown. An Open class for color varieties will include colors not specifically mentioned here, such as yellow and purple.

END

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3/28/61

Lawrence Konig
Executive Secretary
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824 Rebecca Place
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THESE STANDARDS CORRECTED AS OF AUGUST 1, 1965

AMERICAN GUPPY ASSOCIATION OFFICIAL POINT SYSTEM

To be used in the judging of Guppies, both male and female, individually or as pairs, or as so many of a kind.

Where more than one of a kind, the points are to be multiplied by the number of fishes in the tank. EXAMPLE: Two males, 200 points.

NOTE: Where more than one is shown, a House Rule may be established to provide an extra 10 points for SIMILARITY.

A. G. A. JUDGING POINTS-GUPPIES ALL CLASSES

	BODY	DORSAL	CAUDAL
Shape	5	5	10
Size	10	10	15
Color	5	5	10
Condition	5	5	5
	DEPORTMENT		10
TOTAL POINTS			100

BREEDING GUPPIES

The stories told about how the first fancy guppies started and how they were named, developed, how strains were lost and how strains are still with us after all these years are, many and varied. All I can say is, I can't remember all that I have heard on the guppy subject, but I do remember my own experiences throughout the years.

In my story I started with the little common male guppy that had the much larger than normal perfect black triangle tail. This tail was a natural mutation that removed this small male guppy from the common guppy race.

The female was kept separate with the male and, of course all her young grew up to be common guppies. Female after female were introduced to the triangle tailed male, but no luck. All the young reflected the strains of the females used. Six months passed, then I was invited to see some fish my friend Ed Niznik had bought in New York. They were beautiful specimens, blue, green, red spots and almost a speckled rainbow showed in the tails of the two males. They were narrow veil tails as we call them today.

There were babies in the tank and Ed scooped them out for me. I took them home and put them in with my (by now) little old male. About four months later these young fish had their first young.

In the meantime, I had gone to New York to acquire some of these Dr. Ab guppies as my friend called them. In the store, I was taken to two tanks that contained all sword tail guppies and was informed that these were the only Dr. Ab guppies that they ever stocked.

So I bought no fish, went home and waited for the results of the last cross made with my original male (this fish died at fourteen months.) When the young developed, spread around in my ten tanks, there were six little males that resembled the triangle tailed male, but they were much larger in size than the father when they matured.

The earliest reference that I have seen in regard to the "Veil Tail Guppy", is the May 1933 issue of "The Aquarium Magazine." Information in regard to breeding guppies has been printed in several other publications, that will tend to refute some of the points I will make in the following pages.

It is not my intent to create controversy, but to give information and help, clearly and simply from my own ex-

perience and results, that were seen by hundreds of visitors to my back yard fish house.

In spite of claims that fancy guppy strains were developed from common guppies, it is practically impossible in a persons lifetime according to Geneticists to have such a change occur, through deliberate human effort. All the successful breeders I know. started with the best, better than common guppies they could find.

A question that is asked rather often as to the type of environment necessary to develop a common guppy strain into a big-tail guppy strain, I should like to say it cannot be done. I believe this question is asked so frequently because many people are not familiar with the shape or form of what was called the Veil Tail Guppy, ten or more years ago, or I could say before the event of the Wide Tail and Delta Tail Guppies as we know them today.

Having myself read articles and heard lectures by different breeders on how they raised common guppies into fish that were entirely different in tail form from the common guppies they began with, simply by environment and feeding, explains why so many inexperienced hobbyists have been misled, and eventually have become discouraged permanently by their failures.

Certainly the common guppy is the ancestor of the magnificent fish we have today, but such development was not attained by hit and miss methods.

One speaker described his method by stating that he used twelve tanks and at intervals, all the guppies from eleven tanks would be placed into the No. twelve tank. The fish were then redistributed so that all the tanks again contained the same number of fish. Only the individuals were changed. In this way, the speaker claimed, he achieved bigger and brighter guppies as the years went on. From my experience I know that all anyone could gain from such a procedure would be more common guppies. Occasionally, a larger than normal fish might appear, but by and large, an uncontrolled method such as this would not result in a generally improved stock.

Whether this misinformation has been perpetuated intentionally or not, the fact of the matter is that many hobbyists have been working under a misapprehension. Good environment and proper feeding will produce healthy stock, but capturing the sought after features of a mutation is an entirely different matter.

It is a known fact and proven by "Insurance Company Statistics" that the life span of the "Average American" has been increased over the past fifty years. Also the people are

healthier, and no longer subject to diseases of epidemic proportions. All this is due to, better housing, better sanitary facilities, modern drugs and through research. Our medical and food industries have developed improved feeding formulas to give our infant population natural resistance to many diseases that were in the past fatal or caused conditions that prevented the full development of the maximum genetic possibilities that were present at birth.

Now I am saying that due to the above, we have now become a race that when we are fully matured, we find that we grow in size larger than our forefathers and healthier and live longer.

All this adds up to two words "Environment and Food." But!, bear in mind we have not changed our shape or form.

I use the term "better than common guppies" often, but it does not mean that our type of show guppies are healthier or live longer or are less susceptible to diseases than their relations that live in their own natural wild state. There is no doubt that environment can cause changes in the form of living things, but the changes are recorded as having taken ages to happen.

Our present day domesticated guppies will react to environment and feeding much the same as we have ourselves through the years providing certain accepted conditions and rules are observed. Even so we would end up with guppies that would be considered a little better than average.

As mentioned before, in regards to fish being all placed in one tank and then mixed up to be redistributed back among the twelve tanks, could not in my opinion, cause much change in the appearance of the shapes of the fishes, but due to a regular feeding schedule they would grow to be a little larger.

The strain of fish resulting from the use of this mixing method by the speaker were, as far as I knew, the largest known to the general public at that time. I could not reconcile myself to agree that this size could be acquired with so little control. There were not enough tanks involved for the speaker to do any extended line breeding, or even (in my opinion) to do any large amount of really selective breeding.

It suddenly dawned on me that I was mistaken! Due to the way this method was explained, I could not understand how this method could be considered as any kind of selective breeding. Had the speaker said that, "at given intervals, three or four pair of the largest guppies were selected from each tank, and the other matured fish that were smaller in size were discarded or culled out of this breeding setup." There would never have been a doubt in my mind at all.

Since size is a genetic characteristic that can be seen, then we at least have visual control, and so if only the largest fishes were used each time, the fishes were mixed up for redistribution, the end result would be as it was, the largest known strain of guppies at that time. But bear in mind, the general shape of these guppies had not been changed.

Yes, the tails were a little larger but, in proportion to their wild ancestors, the only real difference was in size. If my memory serves me right, I would say that this tank raised strain finally got to be 3 or 4 times larger than the common average guppies that were imported into this country for the Hobbyists.

Again I say, in this type of breeding, if a mutation (change in form) does show up in a few fish, the only practical way to continue this new form, would be to remove these fishes and breed them in a set up that, gives you the best possible visual control.

In order to make some points clear, it is sometimes necessary to repeat some portions of this book. Even when this is done, I realize that some readers still might not get the point I am trying to make.

By this time I know that most of you realize that changes in the form of our guppies are caused by mutation and not by feeding or environment. I recall how "The Flamingo Guppy" had made quite an impact on the hobby here and in Germany. These fish had the most vivid flamingo red color in both the male and female tails. They were a small fish with small finnage, but had a terrific eye appeal. In fact, so appealing, that at shows where ballots were supplied to the public, these flamingo red guppies would receive most of the public votes and in some cases the judges would vote the same.

But in competition judged by accepted standards, they did not have a chance to win. They would of course receive the maximum credit for color, but other factors such as size and shape of body, tail and dorsal fin would out-weigh the color points of the smaller fishes.

The female flamingos had a lot of natural red color in their tails. I saw some at a show that had solid red tails, and the majority I have seen, had more than 50% of the tail colored red. There are not very many of this strain around at present. When they are to be seen, they lack the color that was present in the earlier specimen. I did spend eighteen months trying to transfer this color into our Delta Tail Guppies. Roughly sixty flamingo females (virgin or otherwise) were bred to our best Delta's. The results were always the same. These females would drop only young that were shaped like the flamingo strain (like common guppies) but

larger. The colors reflected in most case the same as was present in the males used, blue or black. There were occasional fish that had mottled colored tails, red and black or blue. I also bred some Florida Flamingo males to our Rut King Delta Tail females, the results here were good. We did lose some of the Delta spread. They were wide veil tails with the colors of flamingo red and maroon in the tail and dorsal fins.



YOUNG FROM SMALL TAIL
FLAMINGO FATHER AND
AND DELTA MOTHER

Now here was a change in form that was caused by the fact that the females used were from a mutant strain (triangle shaped tails.) In this case the genes of our delta tail females were not dominant enough to take over completely, so we ended up with a happy medium. By the use of our breeding rack set up and visual control (as explained in a section of this book) we did keep this strain reproducing veil tail form. Eventually there was some success in achieving triangle tail male descendants from the Florida males, but I could not retain the flamingo red color, it just gradually washed out, and there were no flamingo males around, brilliant enough to reintroduce into the fading color strain.

In using the term "Delta Tail Female," it does not mean that these females have triangle shape tails. The term means that these females are related either as mothers or sisters or cousins to triangle tail males. I have had females that had every kind of a shaped tail from round, to shark tail and lyre tail and also shapes that could compare with Betta tails.

Even with all these tail forms, the females did have young that were in the majority, triangle tail males. Here is where the use of a breeding rack set up, is valuable to the guppy enthusiast. It does give him mechanical and visual control to know which females are related to the tail form he is interested in.

BREEDING by VISUAL CONTROL

Several years ago I wrote my first article for "The Aquarium Magazine," explaining how Dr. John Rutkowski of Trenton, New Jersey, and I worked at developing large tailguppies. At that time there were a few veil tail guppies, but none that could compare with the tail size of the triangle mutations that occasionally cropped up in our experiments.

Our problem was the scarcity of these wide triangle tail males. We would be fortunate if we found five good males out of two hundred. We did breed these males back to what we thought were good females (their sisters or daughters). Since this was the beginning of our attempt to start a triangle strain, it is easy to understand that the dominant genes were from the common or natural guppy line. And, having so little experience on our side, we committed our first mistakes. Our occasional good triangle tail males were bred to our largest and most colorful (in tail) females. Their young were then taken from the tanks and placed in twenty gallon tanks, away from their parents, to grow to size. As their development took place we would see from one to a dozen good young males that would resemble the breeding males we were using, and the rest of the young males would resemble the common guppy type, except larger in size.

This was very puzzling to us because the females we were using looked alike in every detail -- size, color, form. But it became apparent that even if the females used for breeding were sisters, each one did not necessarily have the genes needed to carry on the strain.

Dr. Rutkowski and I finally decided that we were using too much tank space raising fish that were not to our liking. In order to properly observe the development, it then became a must to separate the female fish and wait to see what their offspring would look like. This method of observation then became the best way for us to control the number of unwanted fishes. We were then taking the young from one tank and putting them into a marked tank that told us from which breeding tank they had been taken. This was a step forward, but when good males were found and we referred back to the breeding tank, another problem arose. The new problem, was which of the females out of a dozen breeders was the mother or mothers of the good young males.

Again a new tack had to be taken, since it was not pos-

sible to give a large tank to every suspected good breeding female, and we decided to trust to luck and to our experience of observation. These combined, turned the tide. Dr. Rutkowski and I had by that time about two hundred and fifty tanks going between us. We had been noticing that the tanks holding the breeding females contained mostly large square tail mothers; the odd characteristic being that these tails had a point that extended out on the top edge. These extensions were not too long but were just long enough to cause these females to stand out from the rest. Yes, luck had a strong bearing at this stage of our work. Our space was limited so we decided to choose females from the breeding tank that had given us the best mutations to date. Dr. Rutkowski now had four females separated in his fish room in Trenton, and I had four females in Elizabeth. The next step was to work out a rack to hold smaller tanks and take up less room. The rack sketched here is thirty nine and a half inches inside between uprights, nineteen and a half inches from the floor to the top of the first shelf and fifteen inches space between the shelves.

This is a very versatile rack. Tanks are installed end first and you will find that these shelves will hold five two and a half gallon tanks, five three and a half gallon tanks, or four five and a half gallon tanks. Any of these sizes will work out fine. It just depends on what you want to use. Incidentally, all of my racks are constructed of one inch by one inch by one eighth inch angle iron.

A most important point to remember is to fasten the rack to the wall or perhaps in some instances to the ceiling. I have seen racks even in commercial establishments that have fallen forward and injury has been caused, fishes lost, etc. The fastening is best made from close to the top and should be a fairly stiff piece of metal. I use one eighth inch by one inch with an "L" shape that is drilled to be nailed to the studs...of course you can use your own good sense to work out the proper way. Just bear in mind, you do not want the rack to tip in either direction.

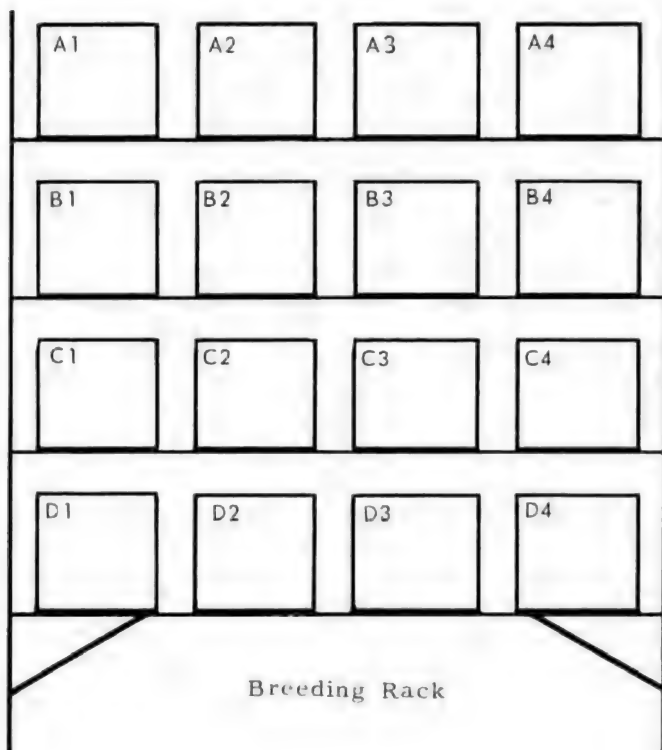
I do stress angle iron because it is light, easy to handle and usually available. I have seen advertising offering, "Set it up yourself steel shelving" at reasonable prices and the angle iron supports are already punched out to make the spacing between shelves adjustable to your need.

You must remember that you need at least five inches of space from the top edge of the tank to the bottom of the shelf directly above, for working space.

So if you use wood to construct your racks make allowance for this working space.

The lighting provided for this rack is a thirty watt fluorescent over each row of tanks. You will find that one of these fixtures fits in easily. I wired mine up against the spacing bar of the shelf directly above. For the top row I hang the fixture from the ceiling. It is also a good idea to place the lights far enough in from the edge of the tanks so that there is enough space to work. Mine are about two thirds in and so I have no trouble cleaning, changing filters or catching fish.

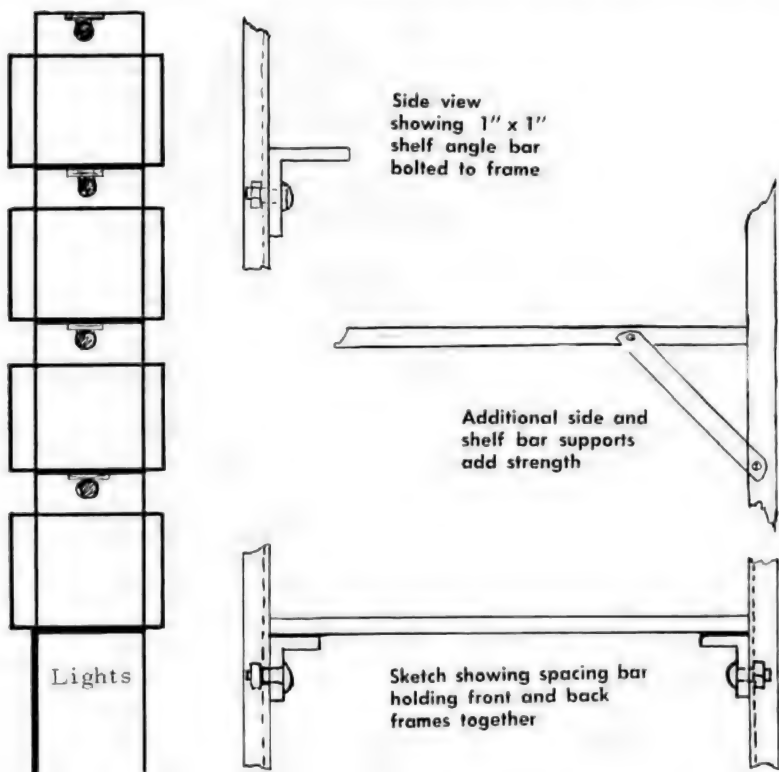
Aeration is not a must but frankly the fish seem to do much better and your tanks are easier to clean because the



filters do pick up most of the floating debris. It is my experience that a sort of a current forms in the aerated tanks and whatever is not picked up by the filters usually settles in a certain corner or around the base of the filter. This also makes it easier to siphon out water, than from a tank that is not aerated and the whole bottom has to be cleaned off.

One of the minor irritations is, when the plastic tubing (air line) gets in the way of working in the tank. A way to get around this is to mount the air-valves on a strip of wood side by side with about one inch of tubing to connect one valve to the next. Mine are fastened this way and the wood strip is fastened to the ceiling in line with the front edge of the tanks. The tubing is then carried back to the wall to drop into each tank from the rear.

Since there are from sixteen to twenty valves to adjust, it is often a problem to trace the individual hose for air adjustment when necessary. All you need to do is to mark each valve with the number of the tank it services. The numbers will probably not be in sequence because you want your air lines to go straight back and down, not criss-cross all over.



Our rack and tanks are now ready to be used. I would suggest that no gravel or rooted plants be used in these breeding tanks just a filter and water sprite, which I think is the best floating plant for our purpose.

Since we had four females that were bred and nearly ready to have babies, our first step then came. One female was placed into number one and so on until tanks one to four contained only one female.

The tanks were given enough light to keep the floating Water sprite green and healthy and not too thick, because it would keep the light from getting down into the tank proper. The females were fed dry food three times a day and brine shrimp once a day.

It is a good idea to turn off the air while feeding brine shrimp so the filter does not pick them up before the fish can eat them...at the same time it is better to put only a small portion of shrimp in at a time and that way they can be eaten before they scatter all over the tank.

Well fed females usually do not eat their young, occasionally there are exceptions but even so some of the babies get up into the floating plants and safety.

When the young were born they were left in the tank with the mother to grow until they could be sexed. The easiest way I found for myself to sex these babies, was to hold a strong light over the tank so that it clearly outlined the baby's anal fins and the males in most cases have a heavier ray on the lower edge. With a little practice, you can get good results with this method. When there was any doubt, I called the fish a male.

The next step was to take the male babies from tank number one and place them into tank number one A, etc. - in other words, the young males were placed in the tanks directly below their mothers and sisters. You must bear in mind to continually observe the babies that are with the mother because many of the so-called females could turn out to be males even as long as two weeks after you had been able to determine the sex of the other males of that same spawn.

I would like to point out that a good many of the remarks I made in my original articles on breeding big tail guppies years ago would not stand up today. This is due to the fact that so many guppy breeders have been developed in this space of time who were willing to pass on their experience and their breeding stock.

At the same time our breeding stock began developing into hardier strains. Also, certain characteristics were becoming more and more inherent to many given strains. These points plus the exchange of experiences among the breeders in any given area helped develop new methods and ideas on how to breed and raise big tail guppies.

There are many thousands of very fine guppies available around the country today and the fact that many pairs of fish

that have been and are bought did and do drop young that are as good in form and color as the prized male purchased in the original breeding stock.

This made the purchasers very happy, so in due time more tanks were acquired and many fish rooms contained dozens of prize big tail guppies. Eventually the original fish purchased grew too old to use and the best of the young were then put in a tank to carry on the line. From these breedings some good fishes would show up, but in most cases not as numerous as from the original pair. It would seem that good points wanted in the male guppies were trying to fade out of the picture. This happening was due to the fact that the breeders were not aware of the observation method that is so helpful in keeping some sort of control in regards to what females to use for breeding purposes.

Of course, we can not tell by looking at the female, what genes she has to make available for our use.

At this stage many would be inclined to fall back on their knowledge of Biology, laws of inheritance and the theories that are used to chart the possible ways that certain characters can be inherited. We know that these things have helped in many fields, but not in guppy breeding. Please do not take me to task for this statement. We do know that genes are present and do certain work in order for our guppy mutations to show up and to continue to do so, just as long as we exercise the control we have available through our method of observation.

In our breeding rack top row, tanks one to four started with four suspected good females. We could only guess at the relationship that these females had to each other. The knowledge that the tank they came out of contained good young males, was the determining factor that caused them to be used.

These tanks by now contain the female guppy and her offsprings.

By the time all of the males from the first spawn have been sexed and placed in the tank directly under their birth-place for example, males from spawn in tank number one are placed in tank number 1A, males from tank number two are placed in tank number 2A, etc. We do want to work with fishes from individual spawns, so when the female has more young, they can be removed and placed directly under or down to tank number 1B and so on. Or you can leave the second spawn with the female and continue to sex the males and place them down below. You can of course tell which fish (young females) are from the first or second spawn for quite a while by their size.

As time goes by the males in row two are growing and we begin to see which tank in the second row contains the best young males. After these males are developed enough for us to decide whether or not we want to continue this line, then comes the time to choose the "good" young females to breed with the best young male out of the best tank on row two. It should be evident by now that if three tanks on the second row contain males that are inferior to the males in one given tank, then the female relations to the inferior males are not the females to use. We have now by observation located our good females and they are in the tank directly above our best tank of young males, their sisters!

The first move now is to discard for our breeding purposes the fishes from the six tanks in the top row and second row that did not come up to our specifications and we are left with two tanks -- one containing our good young males and one containing their mother and sisters.

Our first four breeding females were chosen by guess and by luck, but now we need to choose four young females from the tank left on the top row. Which of them have inherited the same type genes that caused the mother to have the good young males left in the tank on the second row?

In theory, they could all have them. But, now again we will have to trust a little to luck and choose the four largest females from the first spawn. There could also be some form characteristic or similarity visible, reflected between the baby females and their mother.

They can be bred to either their father or to their best brother. These explanations could seem to be too lengthy, but I want to be sure to get the points across to you. The mother and sisters that are left can be placed in another tank or the young females that are left can be placed into a tank by themselves for use as future breeding stock.

You are now digesting the most important point in breeding fancy guppies, and the most valuable aid that has been proven to date, "tracing the root of our mutant stock by visual control." As the cycles are completed and our stock is improving, it is necessary to bear in mind the importance of outbreeding by introducing new blood into our strains before any degeneration of our established lines can take place.

At a recent lecture while I was explaining the visual selection of the best females to use for breeding from our breeding rack set-up, the point of discarding the other fish in the rack was challenged. The question was, "How do you know that the fish in the other three tanks will not have good young in the second or third spawns?" A question like this can be answered as follows:

I have steadily maintained that "guppy genes" can not be charted because they are so variable. Many times I have heard "what percentage of good stock do you get or expect from your established strains?" The answers have been, from one hundred per cent down to ten per cent. My own experience for the past three years has been at least seventy five per cent -- but only if I used visual control through use of the breeding rack: I am sure that many of you have had the following happen...

A picked female after being bred and then placed in a tank by herself would have, in her first spawn, a majority of good males and while still separated from the male, have the second and third spawns that would show a fifty fifty percentage of good and poor young males. Another picked female would have in her first spawn, no good fish at all but in her second and third spawn the majority of males grow up to be show stoppers. Another example was a female that had sixteen sword tail males and five broad tails in her first spawn and then not another sword tail was found in any of her future spawns.

The point I am trying to make is this -- the reason I recommend the breeding rack set-up is because it enables you to visually locate good breeding stock in the shortest possible time. It also keeps you from wasting too much time with too many tanks taken up by fish that are slow to cooperate with our efforts to develop a large-tail strain of guppies.

I hope that by now my ramblings show that I realize "the fish I urge you to discard from your breeding set-up do have hidden future possibilities because they are from hand-picked mutant stock." But who could keep and care for the numbers of tanks it would take to follow each and every spawn from all the females that are chosen in any given fish room...no one!

So, in my opinion we temper our ability to recognize genetic characteristics with a little luck and rigidly adhere to breeding our guppies as outlined. As time goes on, we then need to determine when is the right time to add new blood to the strain. The decision to do this has been forced onto many fish breeders. Because the characteristics that they had been building up in their fish (such as finnage, size and shape), may find that body size or colors show signs of degenerating. The next step then, is to acquire a new male or female from a fellow breeder who has been working toward the same goal. Your aim should be to see that the new stock is comparable to yours in size, shape and color. If the size or color should be larger and brighter, so much the

better! By blending the best efforts of your fellow fish breeder with your own, certainly, the end result will be improvement.

The results of thousands of blendings or crosses between the strains of the various breeders can be seen throughout the hobby by the increasing numbers of guppy shows. These shows are now becoming annual affairs for many aquarium societies and one hundred and fifty entries and more, are now taken for granted!

I would urge you to keep this in mind. It is not necessary for you to wait for your fish to degenerate to any degree before adding new blood to your line. As soon as you have a strain that breeds fairly true, then bring in an outside strain that is comparable in the visual genetic characteristics that we always look for.

For example, let us acquire some females from a fellow breeder. They had been placed with your best male, but it was also necessary -- (if the new females were already bred before you got them) to separate the young from each of your new females up to four spawns in number for male and female separation and observation as outlined previously.

When the new females have dropped their first spawn they can then be put in a tank with one of your own good males. This does not have to be considered a line breeding operation. It is just another cross for you to work on and probably some good results can work out and tie up only one tank.

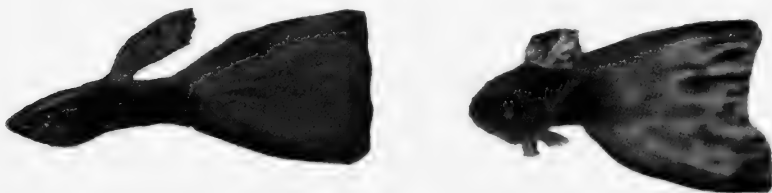
Since you have just watched the young developing from the new females, you know what is more or less inherent to the originally acquired females. So now that the new females have been put in a tank with your male there should be some changes in the characteristics of the young that will result from this cross.

Bear in mind that this is a way to observe changes using only one tank without using the critical observation that is needed to work your breeding rack.

Most breeders would be prone to acquire new fish that resemble their own strain in form. So probably the most important changes that would be noted would be in color or size. It might not be apparent in the first or second spawns because your male might not be able to take over right away. One can be sure that character change will take place.

It all seems easy and in most cases it is but as I have stated before, "guppy genes" can not be charted, as yet. In our continual observation we look for certain characteristics that are caused by genes. When they show up in our guppies we use these fish but again we can only see the mutations in

the males. Because we can see them is no guarantee that the male can project his good points to his offsprings. Of course, in our studies we do note some points in our females such as; tail form and dorsal fin form, or color in the tail. Do not overlook the fact that the female characteristics that can be seen, can also be dominant, and so you can also reverse, and use females to breed for larger dorsals, tails, colors, forms.



Early 1950 Vieltail guppies



Claude McAllister Delta Male, Wilmington, N.C.

In other words, use the breeding rack to observe wanted female characteristics and use these females in the program as outlined for breeding males.

These are things that you absorb in your mind as experience. Again, knowing all of this should leave no room for complacency.

For instance, when all the females from one spawn do not have the same shape tail or the same color, you would be inclined to use the form tail that was inherent to the females that gave you good young in previous breedings or crosses. It is the right thing to do -- you are taking advantage of known characteristics. At the same time, it does not pay to rule out the odd formed tail shapes on the other females from that spawn. After all, they are also related to your good males. Yes, I know by now you think I am talking in circles. This book would not be as helpful to you if I did not get my points across for your understanding.

Now we come to the possibility (and believe me it has happened) when the four young females that had been selected (bred and placed in the breeding rack), drop young that are just plain culls. What happened to the genes that had been working for us until now? These females for some reason or other just were not able to pass on the inherent good points that we know were present in the genetic makeup of their mothers. The proof that the mother was a good breeder for us is in the brother's of these young females. They were what we are always looking for or we would not have used these sisters for breeding.

Now you know why I suggest that you should always have a tank that contains females (virgins if possible) from earlier proven good stock.

One of the answers could be that perhaps the four females chosen did not have the genetic makeup to carry on their mothers good points or maybe the male used was genetically incompatible to our young females.

At any rate, the answer is not too important. We are working with a breeding rack set-up that keeps us from losing a lot of time. Remember there are four shelves on that rack, so if you are caught with a complete wash-out and no good breeding stock in reserve, then I'm afraid you have not been paying attention.



Rut-King male of the 60's

POINTS for the SMALL BREEDING SET UP

The average, would be guppy breeder tends to get discouraged when reading about dozens of tanks set up to carry on line breeding. If you are living in a small apartment, you can raise good fish with a small amount of equipment. I would suggest three tanks, one five and a half gallon for your original breeders, that should be good quality stock purchased from an experienced breeder or reputable dealer who knows the source and relationship of the guppies he is selling. A related trio, one male and two females should be your starting stock. Tank number two and three should be ten or fifteen gallons in size. The first of these tanks would be to hold the babies as they develop and the other tank number three, would be your community guppy tank.

Bear in mind, you must be willing to discard many fish with this small set up; and even so you will soon be running out of space.

The following steps will help you to keep a good strain going.

Your breeders are placed in the five and a half gallon tank that can be planted with saggitaria, vallisneria, hygrophila. If these plants are growing well they will lay over when they get to the surface of the water and act as cover for the babies born in that tank.

Or, if you prefer, "Water Sprite", can be your surface plant, also riccia can be considered. In my opinion, Water Sprite is the best all around surface plant to use; it is easy to separate and keep thinned out, and does not interfere with the net as you scoop out the babies.

A simple way to find the babies in the breeding tank is to place a light against the front glass and look in from the top, the babies are easy to see as they hide in the floating surface plants. Do not let these plants get too thick, because then the babies are hiding in layers of leaves, so they cannot be seen or netted. It is not necessary to remove the females from the breeding tank for spawning.

With well fed fish there is very little cannibalism, and you will save more than enough babies with the floating plant method. The young are then placed into tank number two to grow. As the babies start their growth development, you will observe that some are larger and have better forms than the

others, also the males from five to ten weeks old will be showing their colors. Now you exercise visual judgement, choose the largest females and the largest best colored and only the males that have good form to place into tank number three.

The number two tank is important as the source of males and females to be chosen for size, color and form as replacement or occasional addition to your five and a half gallon breeding tank, that can hold a dozen breeding fishes with no problem.

Again I stress, you must be ruthless when you cull tank number two, it is not practical or possible to keep all the fish that come from the breeding tank in this small set up. Give or sell your discards to fellow breeders or to your dealer.

You will be forced to discard many good fish, but the person who receives your good discards is also the source for future stock when you feel the need to rejuvenate your small set up.

Fish that are continually inbred will in time lose the qualities and vigor that we associate with good healthy fish.

So when you give good stock to fellow breeders, you are in effect dividing your stock. And when you bring some of the offsprings back after a year or so, then you are engaged in out breeding with a related strain.

If a little more room is available then your own good stock could be divided into several groups, that are kept separate for ten or twelve months or more, then the best offsprings from each group are cross bred with each other. Their offsprings are then divided again into separate lines, strains or groups, as you prefer to call them and again the crossbreeding can be carried out as before.

This is a simple way to prevent excessive inbreeding, by keeping related fishes apart for generations, causes them to be practically different strains for our purpose of cross breeding fish that have the genetic character of similarity.

I realize that many who have read and heard of the problems involved in raising fancy guppies would be inclined to feel that some of these explanations are too easy or good to be true.

In the early fifties, yes, but in these times there are hundreds of breeders who have very good breeding stock available to the interested hobbyists.

THE GUPPY FAMILY

The baby guppy being born alive is larger than the young of egglayers when it is born. This makes it stronger and able to eat on practically the first day. I usually put a drop of very fine brine shrimp on top of the water, so that they circulate among the floating plants where the babies are hiding. Very Fine dry food can also be flicked on top of the water.

As they grow larger, they will in two or three weeks come out and take their place under the feeding ring with the larger fishes. The babies can be sexed at about three weeks. I hold a strong light over the young, the females show a dark gravid spot that starts about at the ventral fin (fins that are just before the anal fin) and continues up and back towards the tail. The males do not show a gravid spot. If you try to sex smaller fish, then observe them as they swim away from you and it is usually easy to see the gravid spot even in very small females.

We also have some other factors to help sex young guppies. The anal fin of the male guppy is pointed at maturity, but when young, under good light, you can observe that the lower rays (or ribs) of the male anal fin are heavier than the lower rays of the female anal fin.

Another point to remember is that the female anal fin is wider at the connection to the body and flares out somewhat in the shape of a ship rudder.



male

Male and female anal fins



female

The young males begin to show color at about four weeks old and take from five to eight months to fully develop in

size. The females seem to keep growing for a longer period and usually are half again as large as the males at maturity. I never leave too many young to build up in the tanks with the large fish, it seems to make the adult fish nervous, and I have noted many tanks that were continually overcrowded with young, contained adult fish that had not developed in size and color to match their ages.

FEMALE GUPPY

The female guppy does not have the body colors as does the male, but in the past few years many females have appeared with very heavy tail color.

Another question that is often asked is: "How old should a female guppy be, before putting her with a male?" Many answers may be offered, but who knows better than Mother Nature? When I have females I wish to breed with any given male, I place them in the tank with him as soon as I know for sure that they are females -- usually when they are five weeks old. Nature then takes its course. Very often, I have seen females that had been held for five or six months or longer, that would not or could not be fertilized by the male. Also, on occasion I have seen females drive a newly-introduced male into a corner and keep him there before permitting him to start his courtship dancing.

On the other hand, some females are vigorously receptive to the male -- even before he gets his bearings in the new tank. Which brings up another question: "How long, after being introduced to the male, until the female drops her first spawn?" Since we are always anxious to save all we can from the first spawn, we mark the day of introduction on the tank. In the past we have started watching the tank some eighteen or nineteen days after the introduction, so we could save the babies before the mother ate them. The accepted delivery time was twenty-one to twenty-eight days. When only a few young were found it was accepted because the mother was so young. But here again, by sheer accident, came another discovery: a bred female had been separated to have her first spawn -- and of course no watching would take place for at least eighteen days. While feeding this female on the fifteenth day after introduction, I observed her having young to the extent of eleven. This showed me why some of my other females had such small spawns on their initial venture into motherhood. They or the male had been eating them before I even knew of the births. It is not at all

uncommon for a matured female to take from thirty to fifty days to have her first spawn after being placed with a male.

I do not practice separating females before they have young unless I have reason to save the young of any particular female.

So it is necessary to look for signs of impending birth. The first examination is of the gravid spot just to the rear of the abdomen. If the abdomen and sides of the female are extended and the gravid spot is very dark, it is a good sign. Bear in mind, that the gravid spot can also be very dark after a meal, but your experienced eye determines whether or not the abdomen and sides are extended more than usual.

Sometimes it is possible to see the eyes of the young inside the body of the gray females especially when the sides are distended causing the skin to stretch. It is more common to see the young inside the gold and albino females, because they are almost transparent under strong light.

The factor that I watch very closely is when the heavy female starts to develop a very square chest in a straight line right down from the forward point of the gills, at the same time it can usually be seen that there is a definite protruding of the vent area and the skin in that area begins to assume a light gray translucent color.

It is then only a matter of hours or even less that she will have her young.

She can be placed in a gallon jug or small tank with plenty of floating greens and a fairly low water level so the newborn baby will not have too far to go in their instinctive dash for safety, just seconds after they are born. After giving birth it is often noted that the abdomen area of some of the females has receded up into the body cavity so that the abdomen is actually concave. Seldom is this fatal, I just spend a little more time and effort to make sure that the affected females receive more brine shrimp than usual. In a few days the females are back to normal and no longer need special consideration.

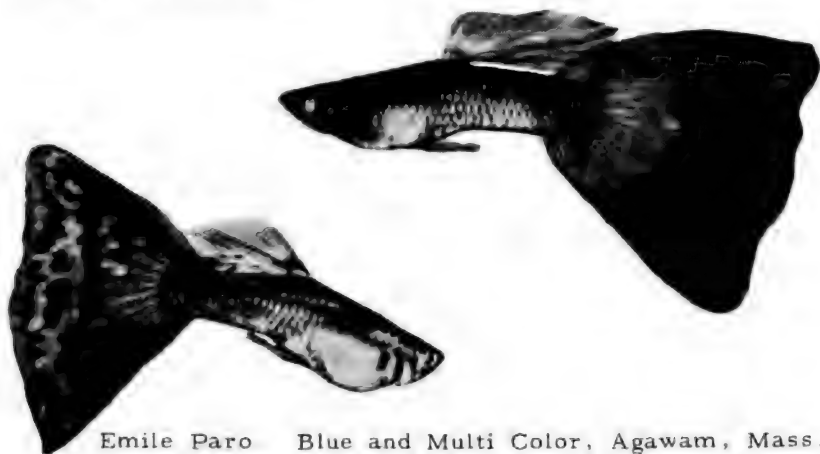
MALE GUPPY

There is not too much that can be said for this member of the guppy family that has not already been mentioned. The inevitable query, "What is a good guppy" has already been outlined in our standards.

The various colors that He can attain are taken into consideration by the color classes in the standards, or in some areas, by club rules.

The male guppy seems to react sexually at a much earlier age than females. I have often noted movements of the gonopodium (anal fin) before five weeks of age. For some reason I can not understand many breeders place the males in one tank. One breeder did tell me that this caused them to grow better in his opinion because there were no females to keep them unduly exercising.

It is my experience that there is just as much activity in a tank holding males alone as there is in a tank holding males and females.



Emile Paro Blue and Multi Color, Agawam, Mass.

The principal chore connected with the male guppy is keeping his finnage in good condition. In my opinion, this is covered in the "Water and tank Condition" chapter. I used to have many cases of split tails in guppies but none at all in the past two years.

I have noted that there is sometimes a case of tail nipping and occasionally chunks are actually pulled out of the tail. It seems that when the skin on the edge of the tail is broken or opened, it attracts many of the fish to take a little nip. When this is apparent in your set up, it would be well to move the affected fish to a separate container until healing has been affected.

The A.G.A. guppy standards show the ideal form for certain strains of guppies, but they are not restrictive. If and when a new mutation in form shows up regularly and is stable to the point, that quite a few breeders have them to show, it would not take long for the new form to be included in the A.G.A. standards as an ideal form for a new strain of guppy.

HALF BLACK GUPPY

I have often been questioned by breeders at shows in many states as to why various types of guppy strain had to be placed in the open class. Strains are usually classified by form such as, swordtail, (single and double) veil tail, (sometimes called wide veil tail) and delta tail, (triangle). And then these are broken down into color classes, black, blue, green, red and multi color.

The above are considered to be gray guppies. This then brings us to the albino and gold guppy strain that are placed in their name classes at the various shows, but they are not placed by form. In some shows they are relegated to the open class because certain areas do not come up with enough entries to merit the cost of trophies that are usually paid for by the entry fees.

To the breeder who might have ten or fifteen tanks devoted to his own strain of guppies, placing his fish in the open class can often bring vigorous protest. Considering all of the crossbreeding being carried on by the breeders between the gray, the albino and gold guppies, it is easy to understand how many different types of guppies in form and color can be and are contained in the fish tanks around the country. In answer to the innumerable queries and letters I have received, giving description of fishes by color and form (especially color), practically everytime a cross is made between strains in your tanks, some fish will show up that are different in form and color and so differ from the present standards.

Even if you have twenty tanks of fish that you consider a new strain, how can you expect a separate class to be set up for your own strain, who would compete with you? So your fish can only compete in the open or non-classified section. Many years ago at the finish of an exhibition and at the time when veil tail and delta tail guppies were judged in the same class, this point was clarified for me.

A fellow exhibitor was packing up his fish and told me that this was the last show for him. I asked him why? The answer was, you are the only one who has this stock and when color is equal, how can the rest of us compete against the larger finnage on your fishes. He was given the opportunity to purchase some of this stock and in time these fish

were blended with his strain and this breeder became known as one of the top men in the field.

It is not a firm fact that a fish with larger finnage as the delta always comes in ahead of the veil tail at any given show. You need to remember that the fish in each class is judged against the ideal fish of that class as outlined in the standards. So it often happens that a swordtail or veil tail guppy does come closer to the ideal standard than a larger finned fish, to take a best of show award.

Probably the most dramatic breakthrough, of a new strain and this is in color was made by the half black guppy. This fish first came to our attention about six years ago as a common guppy with the body black from about the center back to the tail. There were some variations in tail color, from black to red to green and multicolor. Of course, the highlight was that, they nearly all had black pectoral fins. At shows they were also relegated to the open class and seldom took a prize.

As more and more breeders experimented with the half black, the judges and public could see the fishes being developed from common guppy form to the forms that are recognized in our A. G. A. standards for judging guppies. Three years ago Walter Bouranel from Brooklyn took best in show at the largest metropolitan New York guppy exhibition of the year with his half black guppies and they were here to stay.

The half black is an interesting fish to experiment with, because the colors are not anchored enough to be taken for granted. Jake Bell from Newburg, New York, did give me some common half black males two years ago, these were bred to some of my delta strain females (gray).

The results were very many half black delta males with black tails and just as many common gray and half black in the various spawns. One of the largest half black males was bred to a "Mac Guppy Hatchery female" that had about ninety per cent red colored tail. The results were very good about eighty per cent delta tail half black guppies with solid red tails. There is a problem that many of the females are gray. And often when half black male and female (usually) brother and sister from a mixed parent pair (gray and half black) were bred the spawns would usually show all the females to be half black and the males would all be gray or the opposite would be true, all the males half black and the females were gray.

The crosses I made between half black males and females from both half black parents bred highly true. Another problem that showed up were good half black males and females with no black color in the pectoral fins. So in my opin-

ion, I could not consider them true half blacks unless the pectoral fins were black in color. Some of the females that lacked black pectoral fins were bred to half black males and most of their babies featured black pectoral fins.

Three or four years ago, I received some gold guppies from Joe Bartagni, Ed Yahn and John Giuffre, some of the female descendants were bred to a half black red tail male and I did get some gold half black guppy males with red tails but only gold color in the pectoral fins.

The gold half blacks when matured, showed under light, that the black color actually was a combination of colors, black, green and blue, the tails were one hundred per cent red. One gold half black was bred back to delta gray females all his sons were gray with solid red tails.

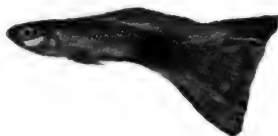
Another half black gold male was bred to albino females, the young from these came out gray with multi color tails red and black.

These young were left together and at this date their young contain albino and half black young. As I said a very interesting fish to experiment with and the only practical way I could do this was with twelve tanks of the breeding rack set up three rows and one large tank to hold the excess young.

To my knowledge, the largest and best half blacks that I have seen around were from half black fathers and the mothers were from good gray big tail stock. These were produced by John Miller of Ozone Park, Long Island, New York. Here again in these experiments we have the indication that males control color and females control form. Again this is not true, but true enough to work with for good results.



Art Hopkins
HalfBlack Cincinnati, Ohio



John Miller strain,
Ozone Park, L.I.N.Y

THE ALBINO GUPPY

There are many guppy breeders who have never seen an Albino guppy. Pink eyes are the factor that makes them outstanding. Usually they are a small fish in the common guppy size, and I have seen them only in gold and red body colors. The exception to this is one of the Albino males descended from a half black gold male grandfather and Albino grandmother.

This fish is very young, about three weeks old and seems to be a male, who under light shows some black or dark color at the base of the tail.

Occasionally some of the more experienced breeders exhibit Albino guppies that are comparable in body size to our standards. Usually the tails are in the veil tail class. The best tail color I have seen was a real good bright red.

There are many charts that are available to show the appearance of Albinism, the disappearance of same in the first generation and the appearance again in the third generation. I would rather rely on clear simple explanation, than to use technical material.

If you want to develop an Albino strain, you need to only secure one Albino guppy. I would suggest that the Albino be mated to a gold guppy. The first generation will probably be all gray. Brother and sister from the first generation are mated and the resulting spawn (and generation) will contain some Albino guppies. You breed these Albino young to each other and can be fairly certain that you have an Albino strain that will breed true.

Of course, you can also breed your Albino to gray guppies of the larger tailed fish and follow the simple outline to another strain of Albino guppies. I would not guarantee the results 100%, but enough work has been done and proven to make this a worthwhile project.



ALBINO AND GOLD GUPPIES

I recently discussed Gold and Albino guppies with Joseph Bertagni of Brooklyn, New York, who is one of the outstanding breeders of these types. Our discussion would fill a book, but here are some of the highlights:

Keeping a strain frequently involves the mating of uncle and niece, and occasionally aunts and nephews. Because these mates are closely related, their young inherit, to a great extent, both the good and bad characteristics that the

Joseph Bertagni, strain result
of crossing Albino male into gray
delta female. Brooklyn, New York



parents have in common. Albino females are not always fertile. They may swell, resorb their young, drop eggs or become egg-bound and die. Unfortunately some of the most beautiful males and females are sterile, but this is the working of Nature and nothing can be done about it. Because fertility is not guaranteed, our only course is to use at least six females when mating. This gives us insurance against the possibility of sterility in some of them.

Mating a gold male that has a large tail and body, with an Albino female for the first cross has one distinct advantage over using a gray male.

Although in both the young will be gray, there is a marked difference in the grandchildren. In the gray and Albino cross, the grandchildren are twenty five per cent Albino, fifty per cent Albino gray. Hybrids are twenty five per cent gray. Unfortunately it is not possible to distinguish the Albino-gray hybrids from the pure gray, and this makes seventy five per cent of the young undesirable for future controlled breeding. When gold males are crossed with Albino females, the grandchildren are twenty five per cent Albino, fifty per cent Albino-gold hybrids (gray in appearance) and twenty five per cent gold. Since the Albino-gold hybrids are

genetically identical to their parents in the inheritance of body and color, they can be distinguished from Albino and golds, and can be inbred again with the same results as from their parents. This three in one combination permits the breeder to develop three different types of fancy Guppies by line breeding the hybrids.

One of the best plans for controlling hybrids involves the use of six tanks, in each of which a virgin female is placed. The breeder places one of his best males in each tank -- then rotates these males from one tank to another. With this method the breeder can keep the strain going for years.

The foregoing is the key that has been sought by many Guppy breeders for years. My thanks to Joseph Bertagni, who, with Ed Yahn and John Jiuffre, make up what I call the "Big Three". They are friends of long standing, always willing to share information.

SWORDTAIL GUPPY

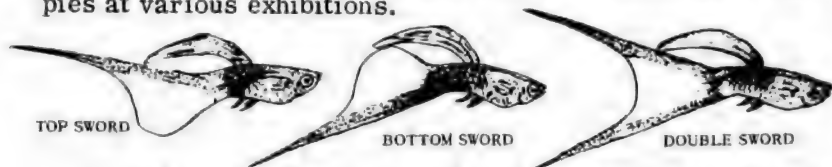
It is a known fact to me that the largest swordtail guppies I have seen came from veil tail or delta tail strains. Often the fishes entered in the swordtail class did not have the true swordtail tail lines as outlined in the then to come standards. Quite a few breeders did work on developing a true strain. Heated discussions often accrued because many of the breeders claimed that swordtail females had to have clear caudal fins, because their own swordtail females had this color characteristic.

Good swordtails take as much time and patience to develop and raise as the other guppy strains. There are quite a few breeders to my knowledge who keep and raise only swordtail guppies.

The most sought after swordtail seems to be the "Leopard Colored" strain. The best example that I have seen was several years ago in the tanks of a member of "The Tonawanda Guppy Group" in the Buffalo, New York area.

Again, bear in mind that when guppies are judged, they are compared against the outline of the ideal fish for their class.

Swordtail guppies have often won best in show due to being closer to the ideal fish than other given strains of guppies at various exhibitions.



It is of course possible to take swordtail guppy mutations that show up in veil tail and delta strains, and in time develop your own swordtail strain. Considering how long it takes to do this, it is much more reasonable to acquire stock from a breeder in your area who has an acceptable strain started. This helps to save a lot of needless lost time and effort, and as has been mentioned here several times, females control form, males control color. It is to your advantage to acquire swordtail females that tend to drop the swordtail form. Practically every area visited where guppies are shown has its share of people who have swordtail guppy stock available.

BODY AND DORSAL FIN SIZE

A much used phrase I go by, (The female controls form and the male dominates or is responsible for the color of the offsprings). This has been true in most of my breeding results.

Fish size is of course another phase, I have used small males to females from lines that had large bodies with good results, but I would rather use large bodied males to regenerate any given strain, my experience shows this way to give me best results.

Many have asked how to build up dorsal fins in their male offsprings. Even though I give the females credit for form, very often some of the father's form will reflect in the form of the sons. So for you who want to breed for larger dorsals, acquire a male with the type dorsal fin you like and breed him to four or five females from your line. I know among the offsprings you will find a male that will be sporting a larger dorsal fin than was inherent to his mother's line. You then can inbreed him back into his mother's line, to sisters, to cousins, aunts or females that are related to good males, who only lacked some size in the dorsal fin. As you experiment along this line, you will suddenly find a spawn of young guppies that have a good number of large dorsals. If you have been keeping good track of your fish, then, you know the sisters of these newly found males, and you realize that among these sisters there probably are some that now have the inherent ability to pass on good dorsal fins to their offsprings, because as I said before the female controls form.



Charles Koepke Male, Roselle, New Jersey

MAINTAINING A STRAIN

The question "how long can a guppy strain be maintained before it is necessary to introduce fish from another source to maintain any given form, color, or natural vigor," is present in every discussion on guppies. I have heard that it is only necessary to choose the best looking males and females from each spawn and the strain could be maintained through generation after generation, for years.

This has not been my experience, of course my experience does not reflect somebody else's results.

At a recent International Guppy Show, when the judging was over and the winners posted, I was handed a sealed letter. It was from one of the exhibitors who had shipped his entries in by air. This exhibitor explained in his letter that the guppies he had entered were descended from a pair of guppies that Dr. Rutkowski and I had presented to his society five years ago. The exhibitor wanted my opinion as to whether or not there was any improvement or weaknesses apparent to me.

I looked these guppies over real well and came to the conclusion that this was the best example of line breeding guppies I have seen. According to the letter these fish had been bred generations after generations for five years, and if my memory serves me right, the guppy's had heavier bodies than my own had five years ago. Their form was very good, but it seemed to me that their color was a little washed out. I looked up the points allowed to these fishes and found that they were nosed out by just a very few points from the top prizes and the points they lost on was color.

Here was a breeder who had line bred a strain for five years with improvement in body size, no loss in form or natural vigor and the only sign of degeneration was a slight fading in color.

Just lately here in the East a breeder who had never entered fish in shows before has been taking prizes with some of the largest veil tails seen around in this area for some time. There was a flaw in this strain, namely, a slight bow in the center of the spine and a tendency towards being tail heavy. In other words, the males were swimming with their heads too high.

Since the finnage and condition of the fishes were excellent, I was curious to know what could cause this posture

in the males. A visit to the breeder's fish room revealed that the posture was not as apparent among the younger fish (four months or younger). In discussing the matter with the breeder, it was pointed out that no new stock had been introduced to this strain for over three years. This could be the one of the reasons for the cause of the flaws in this strain. At the same time there is the possibility of water condition having something to do with the bow in the spine. On two separate occasions, I did bring some of these fish back to my fish room (three months apart). The males did not survive and the females did not have young. If excessive inbreeding was causing this strain to degenerate, this could easily be checked. Females from two other strains have been introduced to young males of this strain showing little or no curvature in the spine. There is a good possibility that these new females will infuse new vigor into this strain. Since environment has so much to do with the good and welfare of our fish, it is also possible to consider that tail dragging could be an indication of fish that have reached maturity three or four months sooner than the average and tail dragging might point up advanced age.

As time went on the newly introduced females that were from a comparable form guppy strain, did have young with straight spines and the breeder continues to pick up his share of the awards.

These are some experiences of other breeders, my results and practices are noted elsewhere in this book.

BREEDING FOR COLOR

When we breed for form in guppies we look for females that are sister to good young males and then separate them to find out which female can carry on the form we see in their brothers.

The above females can be bred to males that have the colors you seek and in my experience the young usually reflect the colors of the male parent.

Let us consider the smaller breeding set up and the fish keeper has females that already contain fertilized eggs. They too can be used in breeding for new color.

A common question is: "How long will it take for a female guppy to drop all the young from the fertilized eggs that are still in her?" Considering the fact that a female can drop from one to seven spawn, and sometimes even more, after she is removed from the male, the answer is "too long". But why wait? Since females that drop big tail

males are not easily acquired, then you can try the following in your search for colors:

Take your known good female and place her in a tank with a male that has the color you prefer. Of course, the first spawn in the new tank probably will be colored the same as her last, the second spawn may have some colors show up that reflect the color of the new male. The third spawn, in the majority of cases, should favor the color of the new male. This has worked out very well for me, and certainly the improved color change will convince you that a lot of time has been saved. Bear in mind, I do not claim that this method is infallible, but it is worth trying and will add to your experience. Some of these methods may seem simple, but they are a lot easier to understand than the "Mendelian Principles of Heredity".

Some time ago, I was invited by Sol Kessler, proprietor of the "Fish Bowl" in Irvington, New Jersey to stop in to see some of his guppy stock. There were six or seven dozen males that were the exact duplicate of our original cross between the Flamingo and Rut-King guppies. The tails were one hundred per cent red. It was the first time in all of my experience that I saw so many males carrying this amount of solid red, and bright too. It actually amazed me because



Result of crossing small
tail Flamingo male to
RUT-KING delta female.



14 week old red tail
male from Don Jacob
male to Delta female,
Stone Mt. Georgia

the hardest part of developing show guppies is to hold on to solid colors or even to keep any given patterns in any colors. It is far easier to develop form than to hold on to the color.

The variegated or mixed color pattern is the most popular, because it is the result of a natural combination of color blending that takes the pressure off the guppy breeder.

In so many crosses, the colors sought after, especially Red and Green, just will not continue to pass on from generation to generation. So here I was looking at six or seven

dozen males with solid red color, even better than any red tails I ever raised and wondering if this breeder was able to keep this color coming up in his future generations.

I did get a chance to visit with this breeder and it just seemed to be, that through some unknowing method he had a color strain that was stable in his strain of guppies. The breeder did explain that many of his customers had told him that when they used his stock to crossbreed into other lines, the red color inherent to his stock would begin to wash out.

The original "Delta Tail Guppies" were black or blue while some were gray and lustreless. Occasionally some would show up with red or green specks in the tails, sometimes forming a pattern. Some of these patterns still show up today at the various shows. In spite of the size to which the Deltas grew, very often they were nosed out in the shows by smaller but better colored fish, usually red. In our breeding experiments we always used our best males -- that is, only those males with the largest tails.

There also, was the time when Don Jacobs, of Stone Mountain, Georgia, sent me a pair of guppies from his red strain. The male was a beautiful red, but had no real tail size. When placed in a small tank he was admired by everyone for his color. But no effort was made at first to breed him. As time passed, his color began to grow on me. I decided to breed him, just to keep some of this color around the fish room.

His mate had long since died, so the Jacobs male was crossed into the Rut-King blue females, five in number.

When the young males began to develop, they were placed in separate marked tanks, so that their mother and sisters were known.

The final result was that three of the females had dropped Delta Tail young with about ninety per cent red color in the tail and some traces of blue or black. The other two females had dropped males that tended to be dark maroon, nearly black.

Six females that came from the spawn containing the best young males were chosen from the spawn and bred back to the original Jacobs male (their father) with the result that again I had a good spawn to work with. Two of these six females dropped good Delta Tails, but the red was already beginning to fade; one spawn had fair red color, while the other was very dark maroon -- too dark to work with.

About this time I was presented with some very nice red veil tails by Father Peters, of Milwaukee -- so I bred a Peters male to the best of the Rut-King cross, and the red color started to brighten up again.

You will note that, even though I selected only females that had big Delta Tail brothers, they did not all drop big-tail young. Even so, bear in mind, that it is always necessary to separate your breeding females to determine which are dropping the good males you seek -- and to recognize the sisters of these good males for use in further breeding experiments.



Edward Hazle RED-STRAIN, Cuyahoga Falls, Ohio

I trust the foregoing is clear enough for all of you who are interested in breeding for color -- and that you have access to females from a large-tail line. I have also pointed out how, in serious breeding, many new methods can be discovered. Often by sheer accident. So, we have found out that it is not always necessary to have a large-tail male in order to make a good cross -- but it helps.

You will often note that male guppies sometimes have a temporary fading or loss of colors. This is caused by water change, sharp vibrations, sudden motion. Color returns when environment is back to normal. Guppies can best be viewed for color by holding a shaded light up to the front glass.

This brings out the best highlights of the colors in the guppies.



Msgr. Peter's strain,
Milwaukee, Wisconsin

SETTING UP THE AQUARIUM

It is important that you give serious consideration in placing your aquarium in a proper and permanent location. I prefer indirect daylight that comes from a northern exposure, East and West exposure will do too, but exposure to the south causes too much direct sunlight which in turn causes an excess of Algae and too much heat during summer weather. Of course, if there is no choice except exposure to the South, then you can cover the rear glass of the tank with a piece of aluminum foil, your dealer can supply you with a proper size piece in a color of your choice. The window blind can be kept drawn low enough to keep direct sunlight from shining into the top of the tank during daylight hours.

Don't underestimate the power of direct sunlight in a matter of a few days Algae can take over control of your tank to cause the unnecessary added chore of cleaning the tank, out of schedule.

The adhesive agent in a newly purchased tank is usually soft and as the weight of the water causes the bottom slate and glass sides to settle firmly against the frame, the excess adhesive (aquarium cement) will be forced to ooze out from between the frame and glass and bottom slate. It is a simple matter to take a sharp blade and trim the excess cement from around the frame. Sometimes the excess continues and calls for another trim in the next two weeks. The bottom is another problem, that is if the tank is set on a solid flat surface. It is not practical to try trimming the bottom unless the aquarium stand has an open bottom. On a solid flat surface I use a piece of one eight inch plywood cut to fit even around the bottom of the tank, the plywood is placed on the flat surface and in turn the tank is set on the plywood. In this manner the cement oozing from the bottom is contained between the plywood and tank bottom and left alone. I have also used thin cardboard like a dress or suit box with good results.

It is necessary to follow this procedure, otherwise when there is reason to move the tank you will not be able to do so because the tank is firmly glued to the bearing surface and the process of shaking and pulling the tank from the surface will usually cause broken glass, a bent tank frame or at the very least a leaking tank.

Bear in mind also, that moving a full tank can cause added grief, so remove all the water at least down to the surface of the gravel before moving the tank. If the tank bought needs cleaning, just use dampened salt and raise out. Don't be concerned if a small amount of salt remains, it will do no harm. Just remember, use no soap.

When buying an aquarium and the accessories, the old saying holds true, "you get what you pay for." A first grade aquarium is built square and the bottom will touch on the four corners when placed on a flat surface.

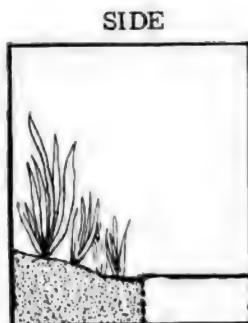
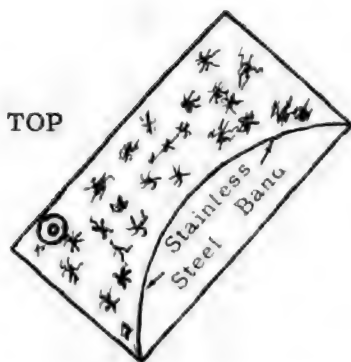
If it rocks a little, then several layers of thin cardboard can be placed under the hollow spots, paper book match covers work well for this purpose. There is nothing that detracts more from the tank beautiful than a waterline that is not level. It is necessary that the surface that supports the tank is level both ways along the front and on along the sides. If you have spaces between the corners under the bottom edges it would be well to support the center of any space with the thin cardboard shims, this prevents the frame from being pushed out of line when the aquarium is filled with water. The importance of the above can not be overlooked, water weighs eight lbs. to the gallon and about nine gallons goes into a ten gallon tank, so if the bottom is not properly supported seventy two lbs. of water can easily spring the frame of your aquarium and lead to leaks. If the aquarium stand is shakey or rickety, then it is a sure bet that floor vibrations and nudges against the stand will cause leaks to show up.

I suggest that the waterline be kept down to two inches from the top edge of the tank, the fish have less chance to jump out and if you have floating plants they will not be burned from the heat of the tank lights. Also, if your tank has a cover the water bubbles from aeration will not splash off the cover and if an inside heater is used, water must be low enough for heater to hang in water without complete submersion.

Because I am writing about guppies, I do not recommend an undergravel filler, as explained in another section of this book.

My favorite tank set up leaves the front quarter or third of the slate bare by means of a piece of stainless steel or plastic or even a narrow piece or pieces of stone approximately one and a half inch high. The gravel is placed behind this barrier and sloped up to the rear, two inches deep.

Gravel should be purchased from your dealer to insure proper grit size, gravel can be too fine or too coarse, the dealer will supply the size gravel for your purpose. The



gravel must be properly washed, it usually contains unwanted dirt, clay, and other foreign matter. Do not attempt to wash it all at once, two or three pounds at a time in a deep dish or pail constantly stirred and poured off until water is clear, goes quite fast. It takes about one and a half lbs., of gravel for each gallon of water in your tank.

There are many of plants that can be used, I'll discuss the plants that are most adaptable to average tank conditions and as your experience with water plants grow, so will your collection of the more exotic plants expand.

For our purpose, these are the kind to consider, *Sagittaria* and *Vallisneria*. These are high growers and also serve the purpose of concealing the box filter and heater and they are planted along the rear of the tank. These plants multiply by means of runners that grow out from the side of the crown and every one half inch or so leaves start to shoot up with roots below, that can be pressed into the gravel. Under proper conditions the plants grow thick enough so that the runner can be pinched off and the excess plants transferred for use elsewhere.

Hygrophila is a good plant to use, planted in front of the higher plants. This plant grows well and can be pinched off and these stem pieces can be pressed into the gravel where they will throw out roots in a matter of a week or two. Water sprite will also create good eye appeal. I never try to root this plant into the gravel, I use a small piece of U shape wire lead solder (no acid core) and place this between the lower stems of the water sprite plant, the points of the U shaped piece of lead being lightly pressed into the gravel.

Under proper lighting, water sprite reproduces very well, new leaves or plants grow out of the joints between the main stem and the leaves. Leaves can be pinched off and left

to float on top as cover for the baby fish and as protection from excess light. The floating leaves also reproduce in the floating state.



Riccia is another favorite floating plant that reproduces into a very thick carpet and portions can be placed into the other tanks.

The next step is to pour water into the tank to about an inch above the gravel. By now you should have a plant layout in mind and set your plants into the gravel by just shov-

ing the bottom end of the plant into the gravel and then gently pull it out so that only the roots are covered. The crown of the root system must not be covered as per illustration.

Do not plant your tank too thickly, leave room for reproductive growing. Like fish, newly acquired plants also need to readjust to new environment, and as they expand in growth the new born plants will naturally fill in the available spaces.

When the plants are set, then the tank is filled to about two inches from the top frame. To prevent the gravel and plants from being disturbed place a piece of cardboard on the surface of the water and let the water run onto the cardboard.

A piece of half inch rubber or plastic hose can also be used to transfer the water to the tank.

Until fish droppings become abundant enough to serve as plant food, your dealer can supply you with plant food in liquid or tablet form with directions for use. It is good standard practice to let your tank stand at least a week to allow the water time to settle and chlorine to evaporate from the water also to give the plants a chance to start growing. Once the tank is set up and filled it is almost out of the question to keep the aquarium owner from adding fish before the waiting period is over. If you are too impatient, chlorine neutralizer tablets can be obtained also three or four gallons of water from an old established fish tank can be added to your set-up. The old fish water contains the needed bacterial life to help season your new tank water and gravel. When your temperature is at least seventy degrees you can now add a few healthy guppies and watch their progress and develop your own talent as a fish keeper before you fill your tank with the amount of fish that your aquarium can support, in conjunction with your growing experience and local environment.

A few words of precaution in regards to metals and plastics that can safely be used in your aquarium. Stainless steel is the only steel metal to use in your aquarium. Lead in the form of flexible roll solder or flat lead used to bunch plants for rooting in small amounts (again, no acid core solder). Stainless and lead can be used as weights to hold down filters. Plastic products from your dealer are usually seasoned for aquarium use. Do not use bakelite, aluminum under any circumstances, they are just as deadly as plated metals, the salts used in plating are sure killers.

The average plastic household utensils, funnels, dishes, etc. are usually acceptable.

WATER AND TANK CONDITIONS

The phrase "Balanced Aquarium" has probably been used more often than any other in our hobby. Through the years we have read articles telling in detail, just how this balance is acquired and maintained. The articles usually stressed the importance of the plants, and approximately how many fish could be kept in any given size aquarium. Another well used phrase is "Aged Water" and usually the advice would be, "at least a week old."

It took me quite a few years and many unhappy incidents to realize that these phrases were not properly explained and so caused many of us to spend fruitless hours trying to match the requirements stated in the various articles.

A few months ago, I met a man who lived in my neighborhood and he had contracted the guppy bug. I knew that he wanted to acquire some of my guppy stock. He had been keeping guppies for about ten months and along the way he had acquired all the material written about guppies that he could find. My friend could quote all the rules and etc. for setting up and maintaining balanced aquariums. Since my guppy stock was limited and it seemed to me that my friends talk was more enthusiasm than experience, I kept putting him off. After four months or so I thought he was ready, so I did let him have some good breeding stock.

A week or so later he called to tell me that all but two of the guppies had died. Well, I just could not understand how this could have happened. They had been healthy fish when they left my fish room. Since they were part of some experimental breeding that I had been working on, I had expected that my friend could follow the outline of the breeding set up I had worked out for these guppies.

Realizing that this person had been keeping guppies for over a year, I had to find out what the reason for this loss was, especially since all of his other tanks were in good health.

I inspected the tank that the fish had died in, it was twenty gallon in size, beautifully set up. Clean white gravel, large water sprite, plenty of light, filter and crystal clear water.

Crystal Clear Water? -- even in a newly set up tank, shakes me up. I was assured that the water had been aged

at least two weeks and with aeration, before the guppies were introduced.

Then I asked what percentage of fish water from the working guppy tanks had been added to this newly set up tank. The answer "What fish water?", my friend went on to say, "I read that guppies season or condition their own tank water." My answer was, "Sure they do if they live long enough in that brand new fresh water."

I can recall from time passed, introducing guppies into brand new set up tanks and how they would bunch up and hover in one spot for as long as five days before they would begin to act normally and take food. The mortality rate was heavy and often after a day or two I would put the fish back into an old set up tank, in most cases it would be only a matter of hours and the fish would be acting happy again.

Probably the most basic point we have learned through our experiences of transferring guppies from one tank to another, or from another fishkeeper and also from the pet shop to the home tank is that the fish in order to survive needs to be placed into water that has the same pH as from where they came. It doesn't matter if they came from 6.6 acid or from 7.5 alkaline water, their new quarters should be comparable at least in pH.

I know that there are exceptions but, not enough to ignore this basic fact. So when pH is not the problem, I look to the other extreme, fishes dying in tanks that had been set up and holding guppies for months. What was the difference between this tank and the happy tanks in the fish room. Was the color of the water the same color as the others?, more or less algae?, was the same amount of water removed and replaced as in the other tanks on schedule?, how about the gravel, when was it cleaned?

Usually at this point the records would show that the gravel in this tank had been due for cleaning weeks passed. What caused this gravel to have this affect on the fishes? It was to the point of an excessive accumulation of excess food and droppings and etc. I often use the term "excessive concentration of minerals" but I'm probably wrong. I had to find a simple explanation and decided that another result from this kind of gravel condition was, an abnormal amount of bacterial life in the tank.

Now my reasoning caused me to feel that this same type of bacterial life was present in the healthy tanks but not so heavy. This was proved in my mind by the fact that the tanks which had accumulated more debris on the bottom could have more of the old water removed and replaced by new water with good results as far as the fish were concerned. Where

as if too much fresh water was added to the healthy tanks. Then an adverse condition could be visually noted and the guppies lost their normal healthy traits for a few days.

As this experience of mine began to sink in, I decided to go by my theory that when I was forced to remove more than the usual amount of water from a guppy tank because it had collected an excessive amount of debris on the bottom, then adding fresh water, I was in fact diluting the bacteria life in the water to where it was compatible with the fish life, plants and lights. On the other hand if I drained out too much water from a healthy tank then I was diluting the bacteria life to the point where it was not strong enough to be compatible with the facts noted above.

It is my feeling that the novice fish keeper should be told that "a balanced aquarium" is not possible without a "Balanced Bacterial Life Cycle" going on in the aquarium water. This can not be expected in a new set up, using only fresh aged water.

The following letter (in part) is a fair example of the "What's wrong with my fish" questions received by me over the years.

"I have a twenty gallon tank. In it are thirty five male red veil tail guppies. Also, an inside box type filter is used. I change the filter wool every two weeks and charcoal every month. The filter runs twelve hours a day. I have a reflector with a forty watt bulb that is on twelve hours a day. The tank is heavily planted with Hygrophila and a heavy population of snails is present. I try to keep these under control by hand-picking but they are always ahead of me. Water temperature is kept around seventy six degrees and there is one teaspoon of salt to the gallon of water. I feed the fish a heavy breakfast of paste food and the rest of the day they receive a good brand of dry food. In addition to the above, I give them a heavy feeding of day-old brine shrimp every other day. I know it is difficult for you to solve a problem you cannot see, but perhaps you can give me some advice. These fish are very beautiful except for the ragged tails. I want to take them to a pet shop now as they are five to six months old, but I am ashamed to have anyone see them in their present condition."

On going over the letter I note that a mention is made of a heavily planted tank which, of course, indicates that the gravel has been installed permanently. Next, it is noted that the filter wool is changed every two weeks. Then the hobbyist goes on to describe the heavy breakfast of paste food, plus dry food later on in the day, and an every-other day feeding of brine shrimp.

It is easy to imagine the contents of the undisturbed gravel after three or four weeks of this heavy feeding program. The uneaten food that has collected is a perfect medium for the growth of bacteria.

Any type of surplus leftover food will cause the bacteria count to increase. Filtration can be counted on to help somewhat but it shouldn't be considered a cure-all for such a situation.

I suggested here that the gravel be washed out more often at given intervals. I try to give information, so that it is understood easily, and there are times when it is necessary to recommend that certain manufactured accessories, have no place in guppy tanks. This does not mean that they are not good, it means that the condition they create is not conducive to the good and well being of our guppies.

The most popular question has to do with split tails and ragged tails. The guppies are in tanks that are serviced by undergravel filters. Now, please bear in mind, I have seen hundreds of "community tanks" that have been set up for more than a year, in some cases two years with a very happy healthy fish populations except for the guppies. They just will not do well or hold up any length of time in the condition created by using undergravel filters.

I have seen several breeders set up brand new tanks, new gravel, use this type of filtration and place only large tail guppies in the tanks, but in a period of at the most time three months and usually much less, the tails of the guppies would start to split or rag off at the ends. I have heard the explanation given, that the fishes had weak tail structure etc. In my opinion there is only one answer -- "Water condition."

I also know breeders who will only use undergravel filters plus a box filter or outside filter combination. Every so often they stir up the gravel fairly well and the majority of the debris displaced from the gravel is picked up by the box or outside filter. Even with this method their guppies matured with ragged tails. It is unfortunate that our big tail guppies are so susceptible to the concentration of chemicals or gases that build up under the gravel. The theory that bacterial action takes place under the gravel and breaks the waste drawn down into gases and then the gases are drawn up with the air bubbles is a sound one.

But it does not work well enough for the well being of the guppies.

The next point I note is "filter wool changed every two weeks", well there is just no way to tell how often a filter should be cleaned except by a fishkeepers own experience.

In this case the period between cleanings is too long, that is, in my opinion because of the statement, "A heavy breakfast of paste food."

Filters should be cleaned more frequently than once every two weeks. The hobbyist will have to work out such a schedule for himself.

Paste food is a good food, depending of course on the formula, but what happens to it once it is dropped into the aquarium? Does it stay together until the fish have consumed practically all of it. Or does it begin to disintegrate and cause a cloud to float around in the tank until eventually the matter that makes up this cloud is absorbed by the gravel or the filter. The cloud I mention causes more infusoria or bacteria to develop than can be handled by the filter even if it were cleaned every week. At the same time the excessive amount of bacteria that would be caused to start, would have so great an impact on the chemical contents or makeup of the aquarium water, causing it to change to such a degree (that in my experience, and there has never been any exception,) is responsible for ragged and split tails in at least ninety per cent of the cases.

Of course, paste food does not have an exclusive here. This can also be caused by the improper use of dry food and live foods that can settle in the gravel and rot or die, so causing the same water changes. Filters are practical additions to the list of accessories that reduce the amount of work connected with fish keeping, but they are not cure-alls.

In our efforts to improve the growth, color and health of our guppies, we are inclined to overfeed at each feeding. When fish are finished feeding and there is still food lying on the bottom or floating on the top, then it is a very good idea to start reducing the amount of food at each feeding. Excess dry food will end up either in the gravel or in the filter, excess brine shrimp will usually end up in the filter where they die and a filter that is cleaned only once every two weeks can surely become loaded with filth that is a prime breeding place for excessive bacteria.

I do believe that a filter in constant use does rid the tank of most of the excess gas from the decaying food that is caught in the filter medium, by raising the gas to the surface through the air bubble tube of the filter. The other point to consider is, if the filter is used only twelve hours a day, what happens to the gases that build up in the gravel, and there are no air bubbles rising to help bring them to the surface.

We then have the problem of gases from the filter and the gravel rising to permeate throughout the entire water of

the aquarium. In some cases the cloud caused by dead and also excessive living bacteria can be seen floating just above the gravel or in streaks (depending on the action that is present in the aquarium due to aeration or water motion, or you might even end up with a tank that has gray shaded water and some very unhappy fish.

As long as a vibrator or pump is part of the accessories in any tank set up, it is my opinion that they should be used twenty four hours a day. It costs only pennies a month more to keep them running full time.

It does take some experience to develop the knack of feeding fish well. After an amount of food has been supplied that should suffice as a substantial meal, it is better to walk away and ignore the fact that the fish seem to want more. Many guppy breeders use paste food as part of the diet, but many of these use bare bottom tanks and are experienced to the point that they have no leftovers, and they are careful to select brands of paste food that do not disintegrate before the fish have finished eating.

Now several months later, another letter came from the same person. Here, in part is the second letter:

"I wrote to you some time ago concerning the trouble I was having with ragged and splitting tails in my guppies. At that time you suggested that I remove the gravel and plants. I did as you advised and although I had a little problem controlling the acidity, the end result was most gratifying. The condition cleared up almost immediately.

Previously, I was ashamed for anyone to see my guppies, they were in such bad condition. Now they have come back so beautifully that I have been able to sell quite a few of them -- in fact fifteen pair this week."

I do not recall advising the removal of plants and gravel. This is a drastic step as far as the aquarium beautiful is concerned. I am sure the same results would have taken place by just washing the gravel out at regular intervals.

I cannot stress too often, the necessity of figuring out a schedule for washing out the gravel in the guppy tanks. This would, of course, vary in different fish rooms. A heavy feeder would have to clean gravel more often than the light feeder. There might be more or less algae, more or less paste foods, etc.

The remark in regard to acidity reminds me of the time I removed the gravel and plants from my tanks leaving only floating water sprite and riccia. My tanks tended to turn acid. I had reason to feel that gravel in the tanks helped to keep them more neutral or even a little alkaline, but I did not want to have over one hundred tanks of gravel-covered

bottoms. It would make more work than I could handle. The final solution was to put a smaller amount of gravel across one end of the tank (as per sketch) with an inverted plastic funnel under gravel. Under the funnel was placed an airline with an open end.

This was a two-purpose operation. The gravel reduced the acidity and the funnel worked as an aerator and filter. Debris is drawn down into the gravel. In my environment, I found out that I had to clean the gravel at least every three



weeks: If I did not, then the guppy finnage would start to split and rag and if I waited for five weeks or more, then I had a condition that reflected back to a dirty full-graveled bottom. You can note that plants are shown in the sketch. They did well and did not seem to mind being disturbed. When the gravel was cleaned, they were replanted with no harmful results.

There are many variations of this method for aerating and filtering. For example, the gravel could be placed against the rear glass from one end of the tank to the other end, being about two and one half or three inches high against the rear glass and sloping forward for about five inches. Under the gravel I used a single section of an undergravel filter and it worked out well.

You must bear in mind, that no matter how clean your tank water looks, it is a must to determine when this gravel should be cleaned. It is a quick and easy job (about five minutes) to use a one half inch hose directly on the gravel, drawing it into a pail. The gravel can then be washed out directly under a faucet and floating debris can be poured off. It is not necessary to get out one hundred per cent of the dirt from the gravel.

Do not be concerned if some floating debris is present in the water after the gravel is syphoned out. We do not want to get the water one hundred per cent clean. And when the gravel is replaced around the funnel filter, it only takes a short time for the floating matter to be drawn down into the gravel and the water will be visually clean and compatible with the well being of the guppies.

pH

The subject of pH in regard to water condition can be explained by a chemist in technical terms, but it is my purpose to make simple explanations.

Water is a compound of Hydrogen and Oxygen, the two substances being purposes, and when water is absolutely pure it will not sustain fish life for any but a very short time, since fish must breathe the oxygen which is free -- that is, not combined with anything else. Water is a solvent and will dissolve oxygen from the air -- this being the oxygen which fish breathe. One way in which we may learn this, is to boil water and allow it to cool, and fish kept in this water will in a very short time be gasping for air, because all of the dissolved oxygen has been boiled out of the water.

On the pH scale for testing the condition of your tank water, 7.0 is neutral, below 7.0 is acid and above 7.0 is alkaline. Seldom does a fish tank ever stabilize in a neutral condition, so it happens that your guppy tank is either acid or alkaline. Baking soda is added slowly, (usually taking two or three days) to reduce the acidity of the tank water, and sodium biphosphate is used to control alkalinity.

Slow change, is important because fishes react strongly to quick changes.

A letter in part: "The pH in my tank is so acid that I cannot find it on the chart of my test kit. Do you advise me to doctor the water to bring it to neutral? My problem is that when I do, it is only a matter of days before it is back to acid."

This water chemistry problem has filled many volumes. The heaviest problem is the effort made by many to "standardize" water conditions.

We do know that many of our guppy ailments can be directly attributed to water conditions, let us review a few points.

I can remember not too long ago when so many people complained, 'I payed a good price, but the guppies lived only a few days, 'He must be selling sick fish only'."

Recollecting the symptoms, and making comparison of present symptoms, they were in most part connected with water conditions.

As time went on and the hobbyist became educated, it became standard practice for the prospective buyer to ask "What pH is your water?" before even pricing the fish.

In regards to continuously doctoring the water, that is a moot point. If your fish thrive in acid water and you keep them for your own enjoyment, then do not be concerned. On the other hand if you sell your surplus stock and they are put into tanks that are of a different pH than yours, then you will end up with many claims for refunds or replacements. The best method for me to keep water to near neutral or slightly alkaline is to filter it through soft gravel as mentioned in another section.

When I acquire new fish, I try to set up a tank with pH comparable to the fishes former quarters then let it gradually revert to the normal conditions in my fish room. Once I acquired fish from water that was so alkaline that I could not quite duplicate it in my tank, twenty four hours later these fishes were actually losing their tails in chunks (dropping off.) By the fourth day all the fish had died, but some babies were born and grew into very healthy specimens as I let the tank pH drop back to the normal pH of my own environment.

Another time, I received some fine males that had been prospering in pH of 6.5 and they easily acclimated to my water conditions.

My own opinion is to suggest, if the fishes are kept for your own enjoyment then leave the water as is, if the fish stay healthy. Of course, if you are engaged in selling and exchanging fish, then your problem is to try to keep the pH between 6.9 and 7.1. This can be done, by more or less gravel in the tank, more or less plants, more or less light and or the use of baking soda or sodium biphosphate.

It is important to syphon out at least two gallons of water a week from a ten gallon tank, three gallons from a fifteen gallon tank and four gallons of water from a twenty gallon tank.

This is easily done by using a one half inch rubber or plastic piece of hose. Remove the water from the bottom of the tank as this is a good way to remove the residue that has not been picked up by the filter. Aerated, aged water at tank temperature should be used to replace the water that has been removed. Seventy five to eighty degrees has been the acceptable temperature in my fish room over the years and the water pH has averaged 7.1-7.2 on the alkaline side of the pH chart.

AERATION AND FILTRATION

It is possible to maintain an aquarium without an air pump or water filter, but not many do. The filter is used to correct the mistakes made by the fish keeper. Usually over-feeding dry foods at the same time the bubbles (air and water) released by the filter stem, help to break up the surface area of the water and so induce collected gases that form in the gravel and water to be dissipated more quickly out of the tank water.

For a one or two tank set up a vibrator will do well, cheap vibrators are noisy, but for just a little more money there are some on the market that are almost noiseless. Again, you get what you pay for, the cheaper vibrators must be set higher than the tank surface, so in case of any failure the air line will not serve as a syphon to empty your tank all over the floor and often through to the floor below. The better vibrators feature a valve that prevents this possible reverse back water flow problem, and so can be set on the floor or out of sight.

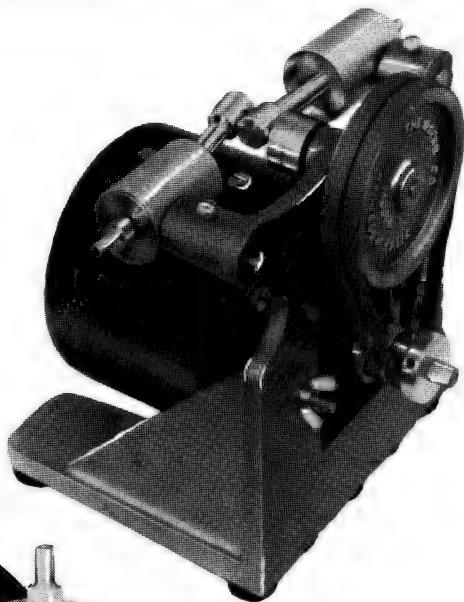
For some reason or other, pump manufacturers tend to underestimate the amount of tanks that their single and double piston (usually belt driven) pumps can handle. There is no reason to use a larger piston pump than you need. In the first place, every air line should have a relief valve at the end of the line. This is to release any excess air not used but produced by the pump. If the excess air is not allowed to escape, then it builds up back pressure that backs up to the pump causing the pump to labor extra hard to push out more air against the built up pressure in the line. I would say that this is the main cause of motors and pump bearings wearing out long before they should.

You can usually tell that this problem is present by the knocking noise that can be heard from the heavy laboring pump or it can also be seen when the pump flywheel is rotating slower than usual. Of course, a slow rotating flywheel can also be caused by a loose belt. My own experience with piston pumps came after years of using a commercial air compressor with the accompanying problems of replacing the pressure head yearly, keeping check on the oil level and the constant presence of oil in the air lines to the tanks.

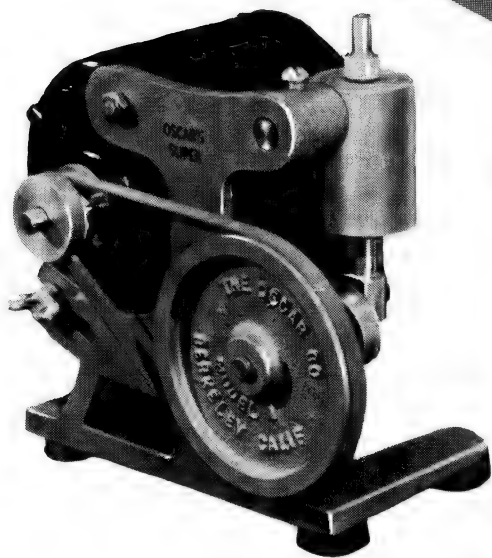
I answered an ad and received a double piston pump that when properly set up did service over fifty tanks for more

than four years with only two replacements of check valves and belts before it finally wore out. The same make pump in a single piston model has been running for three and a

DOUBLE PISTON



SINGLE PISTON



VIBRATOR



half years but I did have to replace the motor after two and a half years and one belt, so far this pump has been taking care of fifteen outlets with air to spare.

This is first quality equipment and costs a little more, gives better service and as time goes, it is more economical due to longer and better service. It is good practice to spread a thin coat of vasoline once a month on the inside of the piston sleeve and to put a drop of oil at least every two weeks in the bearings through the holes provided for this purpose. I put a drop of oil once a month in each of the oil openings of the pump motor.

Many aquarists use their vibrators and piston pumps connected directly to the air lines going right to the tanks. This is all right with a small vibrator, on a one or two tank set up. For the most efficient use of the large vibrators and piston pumps a pressure tank with a gauge showing air pressure should be used. My practice has been to keep the pressure on the gauge down to five lbs. and probably is the reason I get the long service from my pumps.

When adjusting air flow from your filters, always start with the valve furthest away from the pump and work back to the pump, you will find this is the best way to adjust the air flow to your tanks. The use of a pressure tank in your air-line is too important to overlook. I have also found that I could connect two vibrators to the pressure tank and get more pressure and air volume than when the vibrators are hooked up direct to an air line.

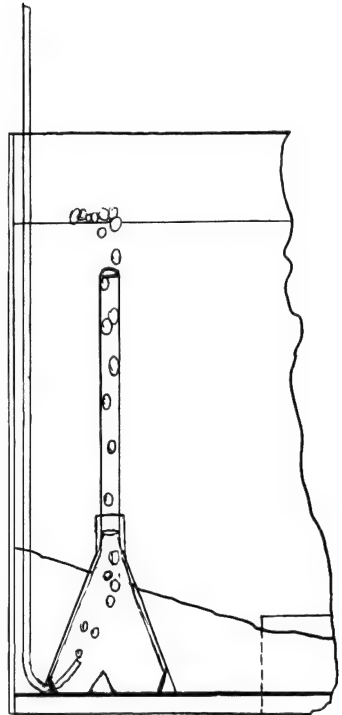
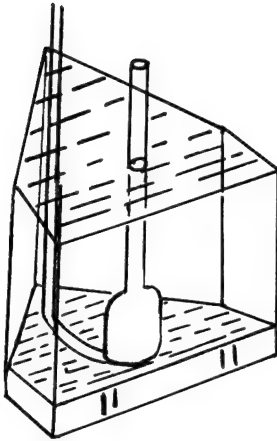
There is no doubt that an aerated tank can support more fish and better plants than a tank that is not aerated. But again, aeration is not a must and if you do not overfeed your fish and if you pursue diligent use of a syphon hose or a dip tube or any of the manual type cleaners on the market today, you can very well have a clean healthy happy, aquarium without aeration.

The box filter, outside filter, have certainly proven their ability to make fish keeping easier than ever. For small tanks the box filter will do well. I advise using the filtering agents that are soft and non-irritating to your skin when handling.

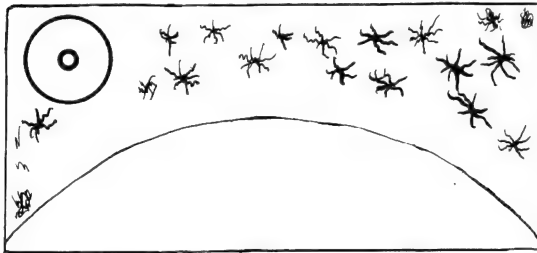
Some of the glass wools are brittle and contain short stiff pieces, that I have often observed sticking into the gills of the guppies. So buy the soft filtering materials that are available.

There are also certain types of honeycombed plastic medical sponge materials available that can be reused over and over again. The higher the stem on the box filter, the better it collects debris. Outside filters draw better than other filters, usually the suction tubes of these filters are pinched closed and small holes are drilled around the bottom end to allow the entrance of water and debris. Should

Box Filter,



Undergravel filter (funnel)



your filter tubes be open on the bottoms, they can be corked up and small holes drilled as above. This is to prevent fishes being drawn up into the filter. Box filters are also made with adjustable openings that are set according to the size of the fish in the tank. For my own use, I invert a plastic funnel in a small dish, fill up the space with marbles about half way up and then cover with a layer of coarse gravel. This makes a fine filter. The funnels I use have a piece of stiff plastic tubing added to heighten the stem for better results. The funnels should not be purchased until you know the size of the plastic tubing available from your dealer.

The air line can be placed under the funnel or right into the stem as is done on the manufactured filters. The plastic funnels should have four notches cut out of the edge around the wide mouth of the funnel that lies flat in the dish or under the gravel, to insure good suction action. The size of the notches should be one quarter inch wide on the edge to a triangle point one fourth or three eighths inch long.

Another helpful accessory is the power filter that is a self contained unit and hangs from the top edge of the tank.

It is helpful for those who have heavy graveled and planted tanks and is used when the gravel is stirred up to loosen implanted debris.

The power filter is a high speed filter that can change from twenty to fifty gallons of water per hour and could well be a boon to the fish keeper with large tanks. Remember, it is important to control the tube opening on the bottom or your fish will be drawn up into the filter, often suffering severe injury. There are also slotted or drilled caps available, that keep the fish from being drawn up into the tubes.

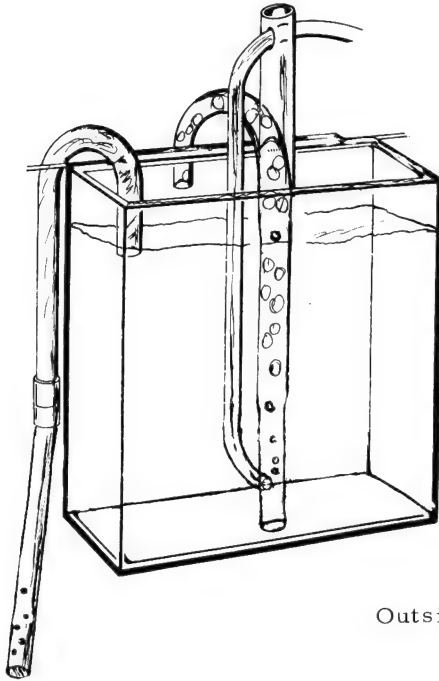
Your dealer can determine the proper filter that will meet your requirements. It is not really necessary to use air stones when filters are used, except in overcrowded tanks. When the bubbles from your air stem are not emerging in a steady pattern, use a thin rod to clean out accumulated debris or snails from the air stem.

The conscientious observation of your fish and tank conditions will gradually help you develop the ability to note changes in your fish from one day to the next. It might be slight change in the shape of finnage, in the manner of swimming or in color intensity. The deportment of any given fish at feeding time, clarity of water, change in plants-well, suddenly you find yourself picking out these points without undue concentration. Your daily experience with your fish has helped you to develop an instinct that will remain with you as an inherent part of your fish-handling career.

When changes in the fish are seen, it should not be the signal for liberal additions of medicinal agents into the tank. First, I make an analysis of the tank conditions. How long since the gravel was cleaned? Is there excess food on the bottom? Are there excessive numbers of dead snails? When was last new water added? How aged was it? Is there too much top cover, such as floating greens, that would prevent the light from getting to the bottom by the rooted plants? Are the plants turning brown? Does the water look roily, oily or thick? Then, I take the pH of the tank and also of the water that is aging. Often, under certain conditions,

the water that is standing does not have the correct pH, and when it is added to the tank the fish are affected.

Some of the treatments used might also change water pH. There is also the possibility of dormant disease and parasites that do not wake up except under certain conditions when your tank is crowded, too new or too old. Often,



Outside filter

when fish are added to some of your other tanks, they can bring dormant problems along to their new home.

I have tried to make the point that, even with all the mechanical help we have, it is still necessary to work out the proper application of our inherent skill to conscientiously care for our fishes. If you keep this in mind, then it will not be necessary to blame our mechanical helpers for adverse tank conditions.

DRY FOOD AND FEEDING RING

In the early days of our guppy breeding experience, dry food was and still is the principal food used by the majority of fish breeders to grow their fish to maturity. Dr. Rutkowski and I were not satisfied with the results obtained at that time from the dry food available. We did do a lot of research and developed a line of dry foods that gave us extremely good results.

These foods are now manufactured and distributed by Rut-King Bioquatics, Elizabeth, New Jersey.

To start a real good discussion at a gathering of fish raisers, just mention your favorite dry fish food. Someone in the group is sure to knock it and of course, someone is sure to agree with your opinion.

If all the ingredients used in the various name brand foods were laid end to end, Oh My! Manufacturing of tropical fish food is done primarily for one reason -- "to make money". There are very few claims of super magic qualities expressed in advertising.

The experienced breeder knows that conscientious work and common sense feeding, not magic, raises, big healthy fishes. The manufacturer knows that getting you to try the first can of his product is not a sign of acceptance, this was only caused by his advertising. When you re-order, then a pattern begins to take form.

In order to know what the breeders need in the nature of a proper formula, there are roughly three ways to find out.

1. By guess, to put out five or six different foods and to note which sell the best and concentrate on these.
2. By checking with groups of fish breeders. In asking the breeders, the manufacturer can learn the good and bad points of dry fish foods, as well as what would make the breeders change to a food different from what they are presently using.
3. By personal experience -- this, in my opinion, is by far the best way, because nothing can beat your own personal experience. The manufacturer who has a fish room of his own, containing many species of fishes, by feeding them regularly and observing the results under his own supervision has the best kind of first-hand information with which to work.

In the Aquarium Industry there is a lot of "Me too ism".

Let a product show signs of growing, someone is sure to say "Oh Boy -- me too, for that business". In order to compete with established name brands, we suddenly find ourselves confronted with some occasional far fetched advertising.

Advertising cannot be refused by publishers, just so long as it is decent. Proof of advertising claims are not subject to control by the publishers. So, in some cases, ads can sell inferior products and many buyers have been disappointed in the end results of some purchases.

This has also caused some organizations to set up testing laboratories for checking the new products placed on the market. These are commendable efforts, but I feel that the average manufacturer is dedicated to make good acceptable, usable products on their own, while their companies are still solvent.

There are many good name brand foods advertised and sold. No matter what the selling point is, there is the proven fact that the best food for your local environment is not necessarily the best for mine.

So the manufacturer is faced with the problem of making fish food that is compatible to practically every possible climatic conditions plus water conditions, hard, soft, acid, alkaline and the amount of mineral concentrates that are found in the various local environments, etc.

One of the common complaints is "The food spoils too easy in the water, it grows in the water, it causes slime on the bottom. Considering that most dry foods contain organic matter, (beef, fish, shrimp, clam, etc.) added to this are various grains and vegetable ingredients. It should be no surprise that this spoilage can and does occur.

It should be kept in mind, that practically all feeding instructions state "Feed only what fish will clean up in X number of minutes". In our efforts to do right we are inclined to overfeed and what is not eaten, drops to the bottom and in no time at all chemical action starts spoilage. This brings letters to the various manufactures, but let's face it.

In our daily diet which is comparable to the organic and grain content of tropical fish food, we do not have the spoilage problem, because left overs are not allowed to lay around. The left overs are put away into a cool spot or most likely into the refrigerators where lower temperature controls bacterial action or chemical changes responsible for spoilage.

In warm and hot weather, the hobbyists have the inevitable complaints about dry foods. The number one complaints, "there are little bugs in the food and or the food is

mouldy, etc. I know if the manufacturers had a choice, these things would never happen. Stock rotation is a must to distributors and storekeepers, in other words, move the old stock to the front of the shelf and the new acquired stock to the rear. There are sections of the country where the dampness of the storage area combined with the climatic conditions tend to cause many of the dry foods to become mouldy.

This is also true for many of the cereal products and flour that we use in the home for our own use. Most of the breeders I know who buy their dry food in bulk usually jar most of it and keep it in the bottom of the refrigerator and keep out enough for a week at a time. Many of the distributors in the south have air conditioned storage facilities for the dry food products. Since the best of the dry foods are composed of organic matter, it does take a little extra effort on your part to keep the food palatable for the fish, at least, try to keep it in a cool dry place, during the hot weather.

The problem of the little bugs is a little more complex. The eggs or possible larve, that they come out of, are practically microscopic and they are already in the basic ingredients of dry food when purchased by the manufacturer. Since these eggs are so small, many of them are not destroyed as their host product is run through the grinding mill during processing. The hatching cycle for most of these eggs seems to work out for warm or hot weather hatching.

There are methods used to treat and eliminate the little bugs once they can be seen. But, the eggs cannot be treated and when the time is right, they hatch. In most cases I have noted that the fishes relish these bugs so don't be alarmed when you find them, use them.

Questions often come in asking how large should guppies be at a given age? Guppy sizes vary at any given age due to local conditions, such as water conditions, regularity in feeding, type of foods, lighting and average size inherent to any developed strain.

Louis Rexford of North Bergen, New Jersey, who is certainly one of the foremost men in the guppy breeding field, raises the most uniform sized strains of anyone I know. So, on a visit to his fish room I did bring some of his fishes up to the glass and measured them, one month old Rexford guppies measured three quarters of a inch long and five and a half month old males measured two inches long.

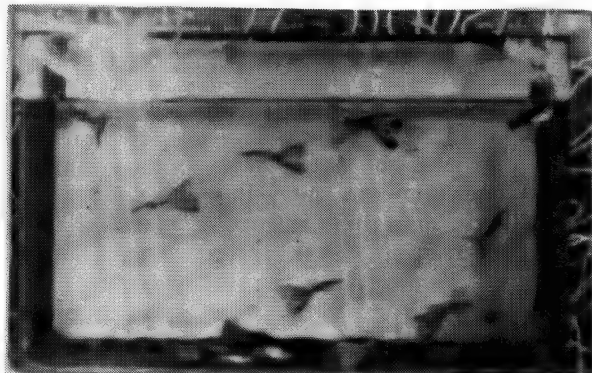
Incredible -- no, here is a man who has made feeding a science. He keeps the conditions in his fish room as standard as possible. The heating system is always on automatic con-

trol, even a sudden drop in summer temperature starts the heat. Feeding schedule is rigidly maintained.

A certain amount of water is removed from each tank on schedule and replaced with aged, aerated water.

I have seen fishes from other breeders that were and are larger than the above, but they lacked the grace of movement and colors were poor. In fact, the larger sizes were caused by training the fishes to over eat or more clearly, these fish were fed many many times a day, but such a small amount at a time in each tank, that some of the fish would loose out and so be ravenously ready for the next feeding.

The readiness seemed contagious in each tank and these fish would reach maturity in four to five months or sooner. The problem with this type of overfeeding is, that this forced growth retards reproduction and shortens the life span of the guppies. So, in your efforts to grow larger fishes, take heed and use your own common sense to work out a reasonable method to feed your fish to a happy, healthy, mature growth.



FEEDING OUTLINE

One of the simple, but also one of the most misunderstood, objects in our tank is the feeding ring. It is usually made from hollow glass or plastic, in various forms -- round, square or oblong. Some experienced breeders may disagree, but I feel that these rings are a definite asset to the health and well being of our fishes.

You have probably found out that your fishes know their food is placed in just one spot in the tank at feeding time. Even between feeding times, any little movement or vibration will cause them to hurry to this feeding spot.

Most of the tanks I have seen have the surface covered with floating grass -- or the leaves of larger plants that have grown to the top. If the food is dropped on top of the water, most of it, or a good proportion of it, will float and spread out -- ending on top of the floating leaves or plants. This is fine for the baby fish that are hiding in the top, but the larger fish manage to get only a few grains and when, a few minutes later, the larger fish are still milling around the outside edge of the greens, still hungry, so more food is dropped into the water. Thus there is a cycle of wasted food and the fish keeper is often amazed that his water is getting cloudy after only a few cans of food have been used. The baby fish at the top, can eat only the fine particles -- while the large particles, already beginning to decay, will form excessive bacteria.

On the other hand, when a feeding ring is placed in the tank, the food is contained in a single area and, as it falls, the fish are under it and will follow the food down to the bottom where it collects under the ring.

Now you say, "How about the babies? Isn't it necessary to contain their food?" As a matter of fact, no. Every tank, whether aerated or not, has unseen currents in the top layer of the water. You can check this by just dropping a tiny pinch of fine food on top of the water and noting how it at once runs into the small channels between the plants.

In nature it is a known fact that fish will get in a current and wait for food to float down to them. Since fish that are small enough to hide in the top require only a small amount of food, the best way to feed them is to dip your finger into the food, then flick off the thin coating of dusty foods that

adheres to the finger -- watching the fry as they face upstream to receive the food.

One of the common problems with a feeding ring is that it sometimes has a tendency to move all over the tank -- and has to be moved back to where it belongs. On one of my visits to a very meticulous breeder's fish room at feeding time, he showed me a tank of sick fish, noting one that was beyond hope. He took a net out of a tray that held many, all in a specially formulated solution that was supposed to kill any harmful germs that might be picked up from any unhealthful tank. After the sick and hopeless fish was disposed of, the breeder carefully rinsed the net and placed it back into the medicated solution.

Now food was to be placed into the feeding ring of the sick tank, but the ring has been moved due to the chasing and catching of the sick fish. A flick of the finger put the ring back in its place -- while a few more flicks removed the greens from the ring.

The ring in the next tank was also out of place and, without benefit of medication, the same finger was used to put the ring back into position.

(S) HOOK USED TO HOLD
FEEDING RING IN PLACE



A very simple way to keep the ring in place is to bend a piece of lead or plastic into an "S" shape, then hang one end of the hook over the edge of the tank, with the other end hanging down into the water. The hook should be long enough so that the end in the water extends slightly above water level.

I am surprised at the number of fish keepers who do not use feeding rings, in fact I am also surprised that there are so many fish dealers who neglect to recommend feeding rings to their customers.

There are some who will not agree that fine dry food is sufficient for the large guppies. You can try it out for yourself. When the fine food is held in concentration by the feeding ring and most of it tends to float for awhile, watch your large guppies go right up into the ring and easily draw in the food.

If the food tends to settle, the guppies will go to the bottom, and because the food is caused to stay in one area on top by the feeding ring, it also tends to concentrate in one area on the bottom for easy recovery by your hungry fish, and/or if any is left over, it can be removed with a small syphon hose or dip tube.

Countless times have I heard, "Only five months old! Why my guppies are ten months old and not as big as yours". There are quite a few reasons for this.

In the first place, a guppy breeder with dozens or even a hundred or more tanks in his fish room to manage over the years, has earned an inherent ability through innumerable observations, visual and written notes, etc. to grow guppies that are superior to those raised by the average one or two tank hobbyist. Even when the hobbyist buys young from the breeder's best strain, seldom do they manage to raise them in size to match the experienced breeders adult guppies.

Often in my lectures, I stress that a very important factor in growing guppies, is to maintain a rigid feeding schedule. Whether you feed your fish twice a day or five times, it should be on time. Think back on the many times you got home late from work, or were doing something around the house, or an appointment to keep, and many other reasons that caused you to think or say "I'm too busy to feed the fish now, I'll do it a little later, or when I get home. In the meantime, perhaps the brine shrimp have hatched and should be fed to the fish, or the worm pan should be checked, etc., etc.

When time is finally found to feed the fish, then it is noted that the neglect has probably caused the live foods to deteriorate or die. This leaves the old standby "Dry Food". I recommend dry food, but not exclusive; guppy diet should be composed of a combination of live and dry foods.

In cases where live food is not too available, most of the frozen brine shrimp, daphnea, etc. can be used with good results.

I stress feeding schedule strongly, because for example, we ourselves for most part, eat three times a day and at the same time each day.

Consider how we react whenever we have our meal-times changed. Well, with our fish, it is the same. When they are fed on schedule, their metabolism cycle is normal and they benefit to the maximum degree.

This is well understood by all the top breeders, and many a meal has cooled on them, while they first fed the fish before themselves.

The following feeding procedure was worked out with the assistance of Dr. John Rutkowski, Trenton, New Jersey, and a leading figure in the development of our present day guppy. This is how we feed our fish...which you can, of course, temper with your own experience.

FEEDING -- Your Key to Championship Guppies!

Assuming clean water and a clean tank, the most important single factor in raising guppies of quality is feeding. It is only through a sound knowledge of feeding the proper food that you can produce superior guppies. Proper feeding is the royal road to success in the entire aquarium hobby. Feeding is the "magic wand" that brings out the maximum genetic possibility in any given fish. A fish can only be as good as the food you give him.

Proper feeding requires the utmost training on your part. It isn't enough to drop an ordinary dry food into your tanks once or twice a day. In fact, every successful fancier of our acquaintance is a "hand feeder." That is, he doesn't use a "shaker top". He keeps his food in a glass jar and feeds with his fingers.

A Balanced Diet Is Necessary

Proper feeding requires a balanced diet of live food as well as dry foods. Although live foods are necessary, they alone will not give the wonderful results that a combination of live and dry foods will give. This is because only in dry foods can the vitamin, protein, fat and carbohydrate content, be controlled.

Use A Light Touch

When you feed any dry food, do not dump it into the tank for it to last until the next feeding. Instead, take a tiny pinch and with a gentle rubbing of the finger, let a little food fall into the tank. If you have several tanks, go on to the next and repeat the procedure. Then, on to the next tank...and the next. When all done, go back to the first tank. Or, if you have only one tank, wait a few minutes. Then, look from underneath toward the light and/or look down into the feeding ring to see if all the food is gone.

If so, give a little more. If not, wait until it is cleaned up. Do Not put all the food in at once for a single feeding. Let your fish fight for their food. Keep them eager.

Maintain Regular Feedings

REGULAR FEEDINGS are a must to assure health and rapid, robust growth. To maintain regularity, use a schedule. Keep it handy and follow it daily.

Suggested Weekly Feeding Schedule

Monday: Three feedings: Dry food. One feeding: Brine Shrimp.

Tuesday: First feeding: Dry food. Second feeding: Brine Shrimp or Daphnia. Third feeding: Dry food. Last feeding: Tubifex worms (Make sure no worms are left when you douse the lights for the night.)

Wednesday: Repeat Monday's schedule.

Thursday: Repeat Tuesday's schedule.

Friday: First feeding: Dry food. Second feeding: Brine Shrimp. Third feeding: Daphnia. Fourth feeding: Dry food.

Saturday: First feeding: Dry food. Second feeding: Brine Shrimp. Third feeding: Dry food. Fourth feeding: Tubifex worms.

Sunday: First feeding: Dry food. Second feeding: Tubifex worms. Third feeding: Daphnia. Fourth feeding: Dry food.

The Foregoing schedule is basic. Once in a while, add a pinch of other dry food, such as SHRIMP MEAT or BEEF MEAL. Fish love a treat. Any time you have an excess of newly hatched brine shrimp, add it to the fishes' diet. But make sure the fish are swimming hungrily at the front of the tank. Unless your fish come to the front of the tank for food, do not feed them! If you do, you will only foul the water.

CLEANLINESS and LIGHT

Clean Your Tank regularly. Pick a day when you have a little time to spare, and siphon the mulm from the bottom. A gallon or two of water out of the tank is plenty. Then the plants. Remove dead leaves. Keep a few snails or a single catfish as a scavenger. For good plant growth, leave the lights on all night, about every third or fourth night. Give more or longer hours of light, if necessary. Remember, that fish as well as plants do well under plenty of light. Do not grow your fish under poor light; their health will suffer.

Feeding Young Fish

Feeding Baby Fish, or "fry" as they are called, is a serious matter. The first five or six weeks of feeding, will either make or break outstanding fish. For the first three days, feed only newly hatched brine shrimp-- several times a day. Watch their bellies. They must be bulging at all times. On the morning of the fifth day, feed nothing until noon. When you see them hunting the tank for something to eat, run your index finger through your dry food and flick the dust left on your finger into the tank. In a few minutes, the fry will sample it. If in about thirty minutes their bellies are not bulging, give them a little brine shrimp. In a few days you will have them conditioned to eat both brine shrimp and dry food.

At the least sign of cloudiness, stop all feeding for a day or so. Usually dry foods will not foul the water, unless you over did your feeding. If all feeding is stopped for a day or so, the water will clear up. Make the fish forage and clean up the mess. If the water doesn't begin to clear in twenty four hours, syphon off all but two inches and add fresh aged water.

Those of you, who, like myself, go around the country giving lectures on fish, realize that the giving of such lectures is no longer as simple as in the past.

This is largely, because there are, in practically every group, at least one or two experts, who know as much or more about the subject as the lecturer himself. Sometimes these advanced breeders have passed on their knowledge to fellow club members in the same manner as outlined by the lecturer, but when this is not so, then the lecturer has the problem of trying to make his points without ruffling anyone's feelings.

It would be very simple to stand up and read an article or a book on the subject, but this sort of information is already well known and would only be boring to the assembly. So, the aim of the speaker is to cover the history, plus most of the important points of breeding and tank care. At times it would seem to some listeners that a lot has not been mentioned. This is usually true, because it is the best way to get the most important part of the talk started-- that is, the questions and answers period. It is then, that the speaker becomes aware as to the information sought or

needed. It is a good idea to have a blackboard and chalk handy, as some points are easier to make visually than orally. In fact, it has often been my experience that the lecture will last some forty five minutes to an hour, with the question and answer period lasting another two or three hours!

I always emphasize proper diet and a rigid feeding schedule control for maintaining healthy, happy fish. But it seems at times that I cannot always get across. For example, at a past lecture, I was questioned by a breeder about a fish food with which I am familiar -- in fact, I use it myself all the time. The breeder explained that he had bought and used some of this food for a week, but gave it up because his fish began to color up in a way he had never seen before in his strain of fishes. It was the breeder's opinion, that the food contained a chemical addition that caused the fish to brighten in color and so was harmful to use. I have reason to know that this food did not contain any such chemical and went on to explain.

When we humans, for one reason or another, go off our feeding schedule, lose out on our well balanced home cooked meals, or eat on the run, we then see a difference in our own color and complexion. We become pale, haggard and run down. When we go to a doctor, the first thing he does is to put us on a schedule for proper rest and diet. In no time at all, our color is back to normal, and we are in the pink again. So, it is with fish.

Here was a case, where the fish had been put on a schedule and fed a proper diet, so that they glowed with good, healthy color. The breeder had never seen this color before and was certain it was not natural. Since the question was answered to his satisfaction, he has resumed use of the questioned food and is once more happy with his fish.

There are, of course, chemicals that will cause fish to color up. The seasoned fish breeder can usually tell the difference between artificially colored fish and natural colored fish. In the artificial, we note high, sharp, hard color and sometimes the scales are individually outlined or etched in black lines. In my opinion, normal color is bright and soft, somewhat like oil paint color.

The qualified judge can usually spot artificially colored fish a yard away, but cannot prove it without a post-mortem examination. Usually, a judge's feelings on artificial coloring is reflected in the points given the fish in the color section of the judging sheet.

BRINE SHRIMP

The aquarium food that is the next most popular, after dry food, is "brine shrimp". It can be acquired in a frozen state ready to feed or in the form of dry eggs, that can be kept in a dry cool area, in readiness for hatching at the convenience of the fish keeper.

Brine shrimp can be hatched in a small amount for the one and two tank set up, with or without aeration. It also, is hatched in one to five gallon jugs in the larger fish rooms and commercial hatcheries.

Frozen brine shrimp is a good substitute for freshly hatched shrimp, but in some areas is not practical due to distance, time and weather. If there is a choice between frozen shrimp or the use of eggs, I strongly advise the use of brine shrimp eggs. There are three or four major brands and each one calls for a slight variation in the method used in hatching the shrimp eggs for the maximum yield of shrimp.

It has been my experience that the time needed to hatch brine shrimp eggs varies from eighteen to forty eight hours.

You will of course learn the hatching time required for the brand you use as you work with them in your environment.

Instructions are usually contained on the label of the egg container. For the set up that does not have aeration available, there is the pan method for hatching shrimp eggs.

Use a glass or enamel tray approximately ten inches by sixteen inches by two or three inches deep, take a piece of wood one quarter inch thick and wide enough to fit down into the pan or dish across the narrow section of the pan. This piece of wood should be cut to follow the sides tightly down to within one half inch from the bottom, and even with the top edge the distance from the inside end of the pan to the wood divider should be about five inches.

This piece of wood is boiled three quarters of an hour to remove any impurities. The pans used should be opaque so that light can enter only from the surface of the water. The amount of shrimp that can be hatched in this way is limited, but usually adequate for one or two tanks of guppies. Make up a solution of eight tablespoons of coarse non-iodized salt to one gallon of water, pour the solution into the pan to within one half inch from the top edge of the pan,

now lightly sprinkle one fourth teaspoon of shrimp eggs on the surface of water in the wide compartment. Cover this section with a piece of cardboard and as the shrimp hatch they will swim under the divider into the light of the other section leaving their shells behind.

Some of the distributors advise using one teaspoon of twenty mule team borax powder to be added to each gallon of solution and reducing the salt to four tablespoons per gallon. In order to obtain maximum hatch in larger proportions, it is necessary to aerate constantly that the eggs keep spinning in the solution. When there is not enough aeration the eggs will settle and the brine shrimp suffocate in the collected mass at the bottom.

Should the aeration be too violent the eggs will be blown up out of the water to adhere to the sides of the jug or container and a poor hatch is the result. Your dealer can supply you with a brine shrimp hatcher at a reasonable cost, that is wide at the top and graduates to a point at the bottom, this type of a container needs less air to keep the eggs circulating than a flat bottom container. I prefer to use inverted one gallon glass syrup jugs, that have a narrow neck. The air stone is dropped down into the narrow neck, do not use an air stone that completely fills the narrow neck, there should be space to allow good circulation. I cut off the bottom by wrapping heavy string around the bottle one and one half inch from the bottom, soak the string with lighter fluid, light it and let it burn and as it begins to sputter out, let some cold water drop on the bottom and the bottom cracks off.

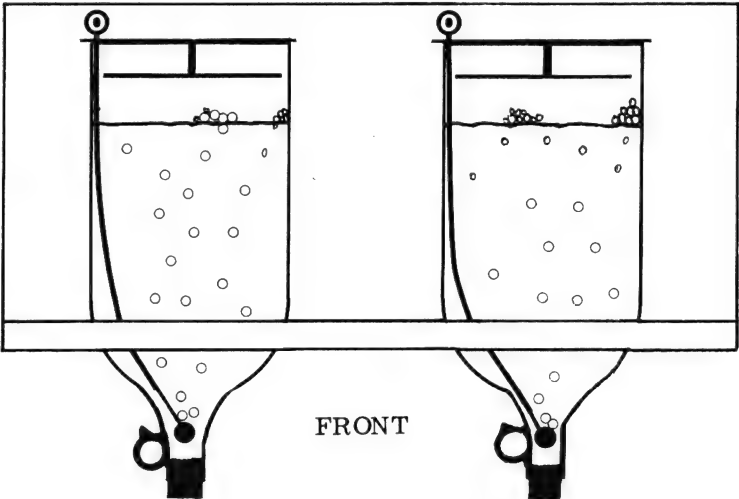
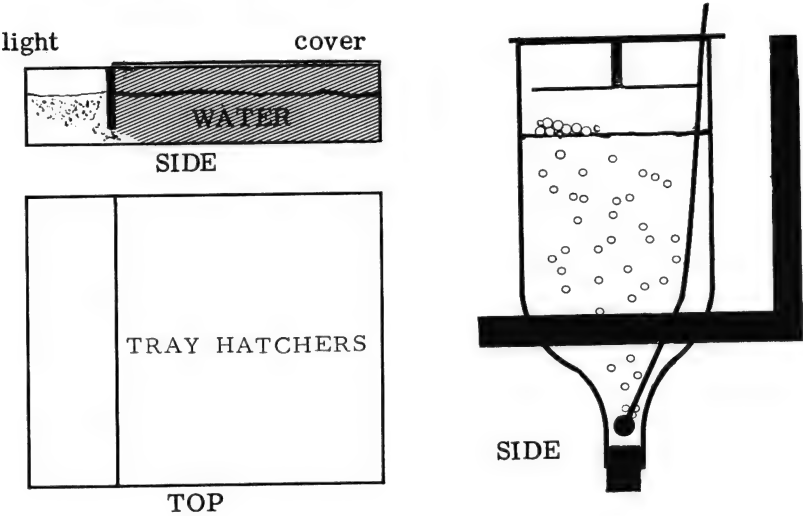
The sharp edge that is left can be smoothed and rounded down with sand or emery paper, be careful of your fingers, this is a very sharp edge.

In this cutting operation, the jugs should be inverted to stand with bottom end up in wide mouth jar or pot that will allow it to stand straight up. Do not hold by hand, until cut and cold. After the edge is sanded and dry, then wrap a few layers of heavy tape completely around and just under the edge. This helps to prevent any easy fractures from slight taps, and never pick up a cut jug by lifting on this edge, always pick them up by the shoulder of the jug.

It must be understood the brine shrimp yield, when aeration is used, is far better than you can realize, you need to try it to know.

Even a one quart round jar can be used with good success. Should you use a flat bottom jar, it should be tipped at an angle so that the air stone rests in the corner of the bottom and side. In a cut one gallon jug, you will only be

able to pour about two and one half or three quarts of solution, and start with one level teaspoon of eggs. A three gallon jar can take up to a heaping tablespoon. As you gain experience, you will get to know your needs if more salt or less, more eggs or less.



2-1 gallon Brine Shrimp Set up

ON LIGHTING

It is not easy to explain to you, how much light is required by you, in your own environment, to maintain healthy fish and plants. Advice has been given that varies from five to twelve hours a day. I average about eight hours of light a day in my fish room, and in your set up, the experience you acquire will indicate the amount of light necessary to maintain normal conditions in your tanks.

It is necessary to know that the various types of lamps or tubes emit rays that differ in length. This means that the penetration of the light is governed by the depth of the water in any given tank. If the water is too deep, the light will penetrate only part way.

For years, I used only warm white flourescent, because I was told that the rays from this were the nearest thing to sunlight. Against my better judgement, I used a cool white flourescent tube and was surprised to note that the plants did just as well. Since then, I have experimented with white and other standard shades and find them quite acceptable.

You should also bear in mind, that the flourescent tube loses effectiveness with age. After six or eight months, the rays will not penetrate as far down into the water as they did when the tube was younger. You should also remember that, since light rays do vary in length, it is necessary to experiment with the depth of the water in your tanks, under any shade -- that is, those you are not familiar with. Often, we have the condition where the lights in the fish room are all the same wattage, whether hung over five and a half gallon tanks or over ten, twenty, or thirty gallon tanks. Under these circumstances, how can the results be the same?

In a five and a half gallon tank the light must penetrate only about seven inches of water. In ten and twenty gallon tanks, from nine to ten inches of water, I have seen large, high show tanks, and, although the light is left on from eight to twelve hours a day, the plants will not grow -- and the water is gray and the tank has a foul odor. This is usually because the lights are too small, of the wrong shade -- or so old that they give off but little light. I have found incandescent light to be the best of all, but unfortunately it also presents the aquarist with certain problems. In the first place, incandescent bulbs are more expensive to operate.

Secondly, if the lights are under hoods, or too close to the water, they give off too much heat, especially during the summer. The wattage of incandescent bulbs must be right, too -- according to the depth of the water.

I also like to see the faintest trace of Algae on the slate at the bottom of my tank -- but only the faintest trace. In order to control its growth, I raise or lower the depth of the water in the tank. If the Algae becomes too heavy at the bottom, I raise the water level. If the Algae growth is too light, or if there is none at all, I lower the water level. The same results can be obtained by reducing or raising the hours, your lights are on over the tanks. In the foregoing, of course, I am referring to tanks that are not exposed to sunlight. Tanks that are exposed to sunlight are a real challenge and have caused many aquarists to abandon the tank. The proper use of light will come to you with experience. I recommend one twenty watt tube over a ten gallon tank, two twenty watts over a twenty gallon tank and fifteen watts over five and a half or seven and a half gallon tanks (flourescent). If you prefer to use incandescent, you will need seventy five watts (clear) over ten gallon tanks, and at least one hundred to one hundred and fifty over twenty to thirty gallon tanks. On the larger tanks it is better to split up the wattage into two bulbs in order to cover more surface area.

An important point to remember in feeding fish, is to leave the light on until they have consumed their quota. We are often told that Guppies can smell the food, but can they? For instance, after feeding fish with a feeding ring, we have changed the location of the ring. When mealtime comes, food is put into the ring -- but where are the fish? They are busy looking for food where the ring used to be! Eventually, a fish drifts over and finds the new feeding location. Then, as that fish starts to feed, it's movements are noted by the others and they too come to the new feeding location. Actually, then, it seems to us that movement attracts fish to the food -- and light is needed for them to see. It doesn't matter whether you are feeding live food or dry food, your Guppies still need light to see it.

After lying overnight on the bottom, dry food -- which is mostly organic matter -- has already started a chemical change, and will not be eaten by the fish. I therefore, suggest that you feed your Guppies slowly, and in good light, so that they can see to follow the food to the bottom and clean it up.

When there is no Algae at all present, it is usually a sign of not enough light, this is a reason to keep your lights on a little longer than has been your practice.

Sometimes a lack of sufficient light is also indicated by a type of brown shaded algae.

Too much light is associated with excessive green algae. This condition calls for less light, cleaning the algae off the glass with rinsed fine steel wool pads (no soap) or a tank sponge that can be purchased from your dealer.

The cleaning should be followed by a gradual water change.

If the algae will not disappear with gradual water change, then it is necessary to completely clean out the tank, scrub the glass and let it dry thoroughly, to be certain that the algae is dead. Many cases have been reported where heavy algae was killed over night. This caused the water to turn gray and cloudy, a sign of excessive bacteria. So, do not expect Guppies to live in this mass of dying and decomposing algae.

I do not advise sunlight on Guppy tanks. It is too much trouble to control. Artificial light is the answer.

THERMOMETERS AND TANK HEATERS

A thermometer is a necessary accessory in a tropical fish tank. The tank temperature should not be allowed to drop below seventy degrees Fahrenheit; if this can happen, then the need for a tank heater is indicated.

With a room full of fish tanks, it is not necessary to have a thermometer in each tank. I keep one in the bottom row and one in the top row of tanks. Even with good central heating, an extreme cold spell can cause problems. The thermometer in the colder part of the fish room, gives you visual warning before it is too late.

When I need to purchase a thermometer, the dealer is asked to lay out a half dozen on the counter, and I choose one from those that show the same temperature. Occasionally, it can be noted that some are way off and it would be no benefit to acquire one of them.

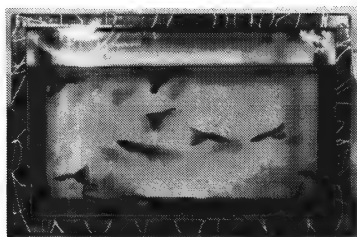
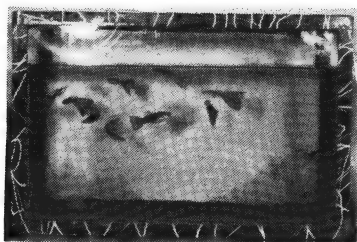
Heaters and thermostats can be purchased singly or as a combination. I prefer the heater with the self contained thermostat, so if something should fail, then only one tank is affected. When the heater is needed, you should have the best recommended by your dealer. The heater is the difference between life and death for your fishes in cold weather, and there is not enough difference in price between a good heater and a poor one to gamble the life of your fishes against the small amount of money saved.

Heaters should be tested for correct temperature before the fish are placed into the tank. A simple and quick method to test a heater is to suspend it in a wide mouth gallon jug with a thermometer and the results can be checked over night. This is a fast way, because it is only necessary to heat one gallon of water to find the heater setting.

A proper heater will have a light that goes on when the heater element is working, heating the water and the light goes off when the desired tank heat is present.

The method I use, is to blend hot and cold water in a gallon jug, when the thermometer shows seventy five degrees Fahrenheit, I suspend the heater in the jug as in a tank. The thermostat control knob is turned until it lights up, this shows that the heater is now set for more than seventy five degrees. With the heater still suspended in seventy five degree temperature water, the control knob is slowly turned back until the moment the heater light goes

out, now you can be fairly certain that the heater control is set for seventy five degrees and the heater can now be safely placed into the aquarium. It must be realized that with all mechanical products there can be occasional failures, so buy the best and reduce your chances for this to happen.



DISEASES

If you give your guppies the conscientious care that has been outlined in these pages, there will be practically no problem with sick guppies.

The first control that you can assert is never to buy or introduce guppies into your tanks that show signs of being sick. No matter how much you might want to use the characteristics visible in any given guppy, if it appears ill, "Do not use it!" This can cause only trouble for you and your healthy fishes and tanks.

Some of the major signs of sickness in guppies are, white spots, velvet like white fuzz on body and fins, constantly close to the surface of the water or staying on the bottom of the tank, very sluggish movements, dorsal fin down, and tail fin contracted together, and drooping limp, unnatural body swelling, usually accompanied by scales extended out from the body, also sores in ulcerated pimple form, open or closed. There are many more, but the above are the common visible signs of sick fish.

It seems that each local area has its own parasitic diseases according to environment. The experienced dealers in your areas have much more experience in dispensing medications for your sick fish than I, and can advise the medication and care necessary to effect cures, when possible for your problem.

It is my opinion, that very sick fish should not be treated, since heavy medication often causes further complications. I eliminate my sick fish by throwing them sharply down on the slate bottom of my fish room sink, it is a humane and quick way to dispose of the sick fish.

The only medication kept in my fish room is a small jar (with dropper in cork) of two per cent Acriflavine solution and a container of coarse unadulterated salt.

The major problems in my guppy tanks have been ich, and split tails.

In ich, white spots about pinhead size are seen peppered on the body and fins of the guppy. This, I treat by raising tank temperature to eighty five degrees and add one tablespoon of salt for each gallon of tank water. Two per cent acriflavine solution is added by drops until tank water is tinted light green. On the next day, if fish are still sluggish and fins folded, the tank receives more acriflavine until a

medium green color is achieved, this usually works, aeration is continued and as soon as the ich is gone, temperature is reduced to normal and tank water is gradually replaced (a little each day) until water is clear.

Bruised and torn areas are usually the site of fungus infections, in light cases, I use acriflavine without changing tank temperature.

Tail and Fin Rot -- Usually respond to Aureomycin treatment, your dealer can supply this to you fresh, with instruction and dosage to treat the entire aquarium.

Scale Protrusion -- Does not react well enough to any medication, so fish should be eliminated.

Velvet Disease -- At a casual look resembles ich, but on closer examination has a velvet look on the fish's skin.

Velvet disease, usually succumbs to five per cent acriflavine solution, two drops per gallon tank water, reduce lighting, and let treatment last four days, remove and destroy all plants. After four days completely change all the water, but be sure at least one half of new water, is water from an established healthy guppy tank. If four days later, velvet is still evident, repeat the treatment.

I like to use acriflavine for tinting the water whenever my guppies tend to show discomfort, constriction of fins, or when any other than normal signs, become apparent. It is a fairly bland dye and effective also does not, from my experience, hurt the plants.

Occasionally, I note signs of possible splits forming in tails or dorsal fins, these receive immediate acriflavine two per cent solution treatment for the entire tank.

Dr. John Rutkowski makes a very interesting point in helping to heal split tails. In the light or short splits, he uses the acriflavine treatment; in heavy splits he turns to preparations such as, Bacticide or any other commercial product with about the same analysis.

However, Dr. Rutkowski does not put the ailing fish back into the large tank. The fish is usually placed in a two gallon tank, with just enough water from the "home tank" to barely cover the fish -- the water being about one-eighth of an inch higher than the fishes tail. You may think this is not enough water, or that the fish is not getting enough air, but I have seen them in this environment for several weeks with no ill effects.

You can always place a small air stone in the water if your conscience or experience dictate.

Let us be practical, when illness in fish can be traced back to improper tank care. Do not expect medication to

make poorly cleaned and neglected tanks able to support fish in a happy and healthy condition.

Red leeches are sometimes introduced into aquariums through addition of new plants or live foods. I do not believe that they cause any harm to live fishes, but they do not add to the aquarium beautiful. Leeches hide in the gravel and at any slight vibration dart out of sight. An easy way to net them is to approach the tank quietly in the dark, net ready, and as you turn on the light they can be seen on top of the gravel for easy netting.



Grand Champion Award to The Worcester Aquarium Soc.
from

The Fireside Aquarium Soc. 1958

SEASONS

Winter is the season of the year which I regard as presenting the best possible conditions for the raising of Guppies.

We leave behind many of the spring and summer ills, caused largely by water conditions. Heavy spring rains cause excessive ground surface washoff, and these pour excessive minerals into our reservoirs. In summer, when the reservoirs drop, due to lack of rain, we have the problem of excessive sediment -- and even more concentration of minerals in the water.

When fall and winter rains and snows come, however, the water level in our reservoirs increases and becomes fairly stable -- and the mineral make-up of the water remains the same for a good many months. The only drawback is that it takes longer to age the water before putting it into our tanks.

Summer can also cause a problem through its fluctuating temperatures, which varied from ten to twenty degrees during the summer just past. And there is no practical way of controlling this, except to keep in mind that exceptional warm water, contains less oxygen. This can be rough on the guppies. The condition can be alleviated by adding extra air stone giving off fine bubbles to each tank, and increasing the air pressure on exceedingly hot days.

We come into the fall and winter seasons, however, with the ability to control tank temperatures to any desired degree, for many months.

The majority of hobbyists are one and two tank owners, and their most practical means of tank heating are thermostatically controlled heaters, of which there are many types. Those that hang into the tank have been found satisfactory. Now and then they may cause a "cooked fish", because of mechanical difficulties, but these occasions are rare, if you use first quality heaters.

Years ago, my best tank of breeders -- which were the start of the Rut-King line of Guppies -- was cooked, due to a defective heater. As I stood looking at the steaming water surface, I saw three years of work wasted -- literally "going up in steam". I kicked myself for having all my good known females in one tank -- and wondered where I could get the right stock to start again. Suddenly, I detected movement.

In the very top layer of water, right next to the glass, were twelve or fifteen tiny babies. The air in the room evidently was cold enough to transmit the coolness through the glass and down along the edge of the water. This stroke of luck saved these babies -- and they grew and helped to keep me in the big tail hobby. So -- don't keep all your good females in one tank!

When it comes to heating ten or fifteen tanks, or more, individually, I suggest that you look into the possibility of using some sort of space heater. There are so many good electric and gas heaters available, with adjustable thermostats and fans attached, that would heat small rooms quite economically -- much more so than using twenty or thirty individual tank heaters. A little experimentation will tell you what thermostatic setting is necessary to compensate for the outside temperature.

You will also find that with the use of a space heater, the tank water evaporation is less than with individual tank heaters.

It takes only a little common sense for the cold weather care of our guppies. The common guppy is a hardy individual, and in its natural habitat, suffers many hard knocks of a kind that cannot be absorbed by our pampered, tank-raised, hand-fed fish.

Your tanks should be placed in a spot, free from cold drafts and the possibility of quick chills. In my experience, open doors and windows, have caused many of my fish to come down with ich. This has also happened in the summer time when temperature and breeze had brought tank temperatures down from ninety degrees to seventy degrees in a ten to twelve hour period. Yes, even at high temperatures, fish will react to sudden changes.

Our fish can survive the above problem, but since we want them to be in prime condition at all times, then the best care is essential.

Another little point: When washing out the gravel in your aquarium, and you give the final rinse with cold water, do NOT drop that fifteen or twenty lbs. of cold sand back into the tank until you have run warm water over it -- or brought it back to tank temperature.

Cold winter air, or the wrong climate, can also mean that a change in time is needed to age water. Actually, in my opinion, aging is the time required for the chlorine to evaporate from city tap water. The process of aging water, can be hurried by using an air stone in the standing water. In the summer, when we have eighty-ninety degree temperature, I do not hesitate to use the water when it has aged

thirty six hours. I have also replaced water in the tanks, using hot and cold mixed water, with no ill effects. Even the artificial heat created in my fish room, usually eighty degrees all winter long, still takes longer to age the water. This varies, according to your own conditions.

To the expert breeder, my explanations may seem long-winded, but I am trying to get the points over to the hobbyists, who have had less experience than myself. An extra line or word might help you to solve one of your problems.

In the cold season, too, live food is usually scarce, so most of us will be feeding dry food, and some of the frozen foods. Do not expect your fish to eat the same amount of food in ground dry food, as when you were feeding daphnia, tubifex worms, etc. They fill up much faster on good dry food, because it is concentrated and contains practically no moisture.

Use a light touch in feeding dry food, but feed more often and you will discover that your tanks last longer between cleanings in the winter than in summer.

SNAILS

Some mention should be made on snails. I prefer the "Ramshorn Snail" or "Japanese Pond Snail", they are small and active scavengers. The problem is to keep them under control. If the snail population becomes too large, then we are confronted with more droppings from the snails than from the fish.

Too many snails are also unsightly and the glass is continually spotted with snail eggs that have a clear jelatin like appearance. The eggs can be wiped off the glass with an aquarium sponge and excess snails can be scooped up with a small net until a happy medium is reached.

A few words on the "mystery snail". There is nothing more deadly to our aquarium fish than a sudden change in the chemical makeup of the water in the fish tank. The changes can be caused in many ways; 1. the improper use of pH changers, 2. changing old water for new, 3. Foreign objects falling into the tank, and 4. bacterial action. Having noted on many occasions the use of mystery snails in small tanks and what happens when one dies and is not seen right away to be removed, can be good reason not to use these snails in small tanks. My experience took place one night when I went into the dark fish room and flashed my light on a large tank containing angel fish fry. They were close to the top, next to the glass, and along came my two big mystery snails gliding along the glass, gulping down the small angels by the dozens...no wonder so few survived.

Have you ever heard this, "FANCY Guppies -- who wants them? They are too much trouble to breed!" Actually, most hobbyists are one and two-tank keepers. If only, the very rare and most expensive fish were sought, there would be no "tropical aquarium industry" which is so necessary to the success of the hobby.

Looking back through the years, I can recall many tanks of the beautiful "Trinidad Guppy." As I remember, they tended to be all colors of the rainbow, with usually a background of blue to purple shades. The Trinidad Guppy was popular then, but I haven't seen any of them in years.

In our efforts to improve on nature, we have managed to change much of the natural form of the Guppy, but seldom do we see colors in our hybrids that compare to the fish that were imported years ago. Not that I am turning

against fancy Guppies, I am merely trying to point out that there are still many pleasant hours to be had, keeping the common Guppy.

Whether we keep the hybrid, or the so-called common Guppy, it is still a challenge to make sure that they remain healthy and full of vigor.

It is unfortunate that, in order to become a successful Guppy breeder, so many tanks are needed. Usually, when this happens, then the operation gets so large, that it interferes with the everyday cycle of normal family living, and outside social activities. Many have made the sacrifice, and found that their hobby was overshadowing family activities to the point of resentment. Trips to the movies, bowling parties, visits with friends -- these are canceled, due to the advent of the fish room. Once in a while, we find an entire family involved in fish keeping and then there is no problem. This is rare. A hobby is for fun and relaxation. Once it begins to take all your spare time, the fun and relaxation are gone -- and gradually your interest in the hobby lags.

REVIEW

It is with pardonable pride, that I view the ever-expanding ranks of members in the "Guppy Breeding, Raising and Showing Corner" of our Aquarium Hobby. The long hours many have spent encouraging, instructing, and building the A.G.A. have not been in vain. But we have not even scratched the surface of the potential developments possible in Guppy breeding.

The names of the show winners known to us are not always the same month in and month out. This shows us that the era of the one, two or three man rule in prize winning, Nationally and Internationally, is over.

Our association has proved that the only thing needed to bring out the inherent ability in our breeders was to pass along some of the original Guppy mutations that started this Guppy trend some years ago.

Unfortunately, not everyone who has been successful is willing to help his or her fellow hobbyist. That is human nature and we'll just have to grin and bear it.

The experience gained and the prizes won at the various local shows have put many people in the position to speak about or pass along information on "Guppy Breeding". The people who do this are morally obligated to pass on the true facts to the best of their ability. It is no crime to be stumped by a question, but it is very unfair to pass along improper information. This I say, because I know that many of the newer hobbyists are prone to accept anything coming from speakers or writers as the gospel truth.

The above remarks arise because I have received many letters referring to information and advice passed on, that is contrary to the knowledge and experience of all the better known A. G. A. breeders, including myself. Even though we work with mutations, certain things are biologically impossible. You cannot breed a fine strain of Guppies that are unrestrained in pools or large tanks, because there are always the "culls" or throwbacks to the original common Guppy that are hard at work to help Nature get back "her own". Also, you cannot inbreed incessantly and maintain a good healthy strain of fishes.

Again, let me repeat, this is a wonderful hobby, especially when shared with our friends. But the easiest way to lose friends, and for the Society to lose members, is by

misinformation. It leads to a loss of interest by the affected persons.

Very often, I receive letters from readers asking me to prove or disprove articles written by writers versed in genetics. I am in no position to write about genes or their connections to any chromosome, and probably you would not be in the mood to enjoy reading technical data relating to the Guppy.

The geneticists who write about the genes, etc., have many past examples of early theory that have helped them to prove their points in the development of many species of living things. They have caused mutations to be charted, so that they are now, in many instances, commonplace.

We, in our effort to develop Guppies, are working with mutations that still refuse to be classified and charted. Of course, we are doing better each year, due to the fact that more and more people are breeding and experimenting with stock from the best breeding strains available, and are often willing to share their good results with fellow hobbyists.



I have received dozens of letters from persons asking my advice or opinion on their plans for building of fish rooms and raising numbers of guppies. They are not looking to make money, they just want to get their expenses out of it. A writer, like myself, can help the average fish keeper learn more about the Guppy and enjoy watching its' development and growth into superior healthy fish. The slight expense involved is easily overlooked as you polish the glass of your favorite conversation piece.

THE END

AQUARIUM SOCIETY LISTING

U.S. CANADA

K.P. Estes
Mobile Aquarium Society
P.O. Box 1013
Mobile, Alabama

Valley Aquarium Society
P.O. Box 3993
Phoenix 30, Arizona

L.E.R.C. Aquarium Society
2814 Empire Avenue
Burbank, California

San Bernardino Orange
Belt Ag. Society
Mrs. Patti Allen
2765 "E" Street
San Bernardino, Calif.

San Francisco Aquarium
Society
Steinhart Aquarium
Golden Gate Park
San Francisco 18, Calif.

Exotic Fish Soc. of
Hartford, Inc.
Albany Branch Library
1250 Albany Avenue
Hartford, Conn.

Norwalk Aquarium Society
Ginny Reed, Sec.
15 Center Drive
Old Greenwich, Conn.

Northeast Council of
Aquarium Society
34 Stoddard St.
Seymour Conn.

Suncoast Aquarium Society
P.O.Box 12876
St. Petersburg, Florida

Hawaii Guppy Society
P.O.Box 572
Honolulu Hawaii 96809

New Orleans Aquarium
Society
3501 DeSaix Blvd.
New Orleans 19, La.

The Fireside Aquarium
Society
Mrs. Joan Gallini
6 Carl Road
Arlington, Mass.

Worcester Aquarium
Club
B.C. Weed
283 Davis St. RFD
Westboro, Mass.

Heart of America
Aquarium Society
Kansas City Museum
3218 Gladstone Blvd.
Kansas City, Mo.

North Jersey Aquarium
Society
Mr. Ed Blum
61 Van Brumton Drive
Clifton, N.J.

South Jersey Tropical
Fish Assoc.
105 Whitman Avenue
Collingswood 7, N.J.

Greenville Aquarium Soc.
Carolyn Kessler
56 Wolf Place
Irvington L.N.J.

Hudson-Bergen Aquarium
Society
Kunisch's Hall
67th & Hudson Blvd.
North Bergen, N.J.

London Aquaria Society
P.O. Box 484
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Ottawa Valley
Aquarium Society
P.O. Box 542
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Peterborough Aquarium
Club
Mrs. B.C. Hinks, Sec.
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Toronto Aquarium Society
1204 College St.
Toronto 4 , Ont. Canada

Fancy Guppy Assoc.
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212 Ashton New Road
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Queens City Guppy Breeders
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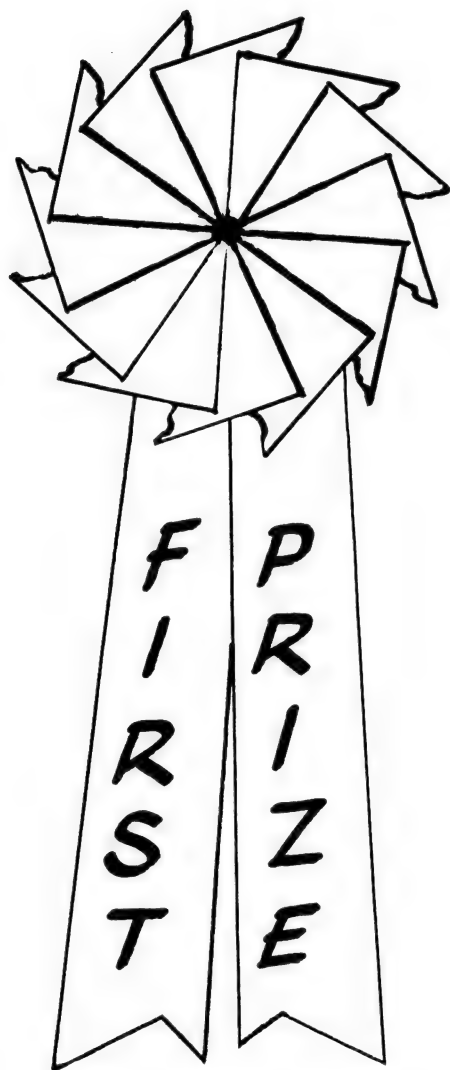
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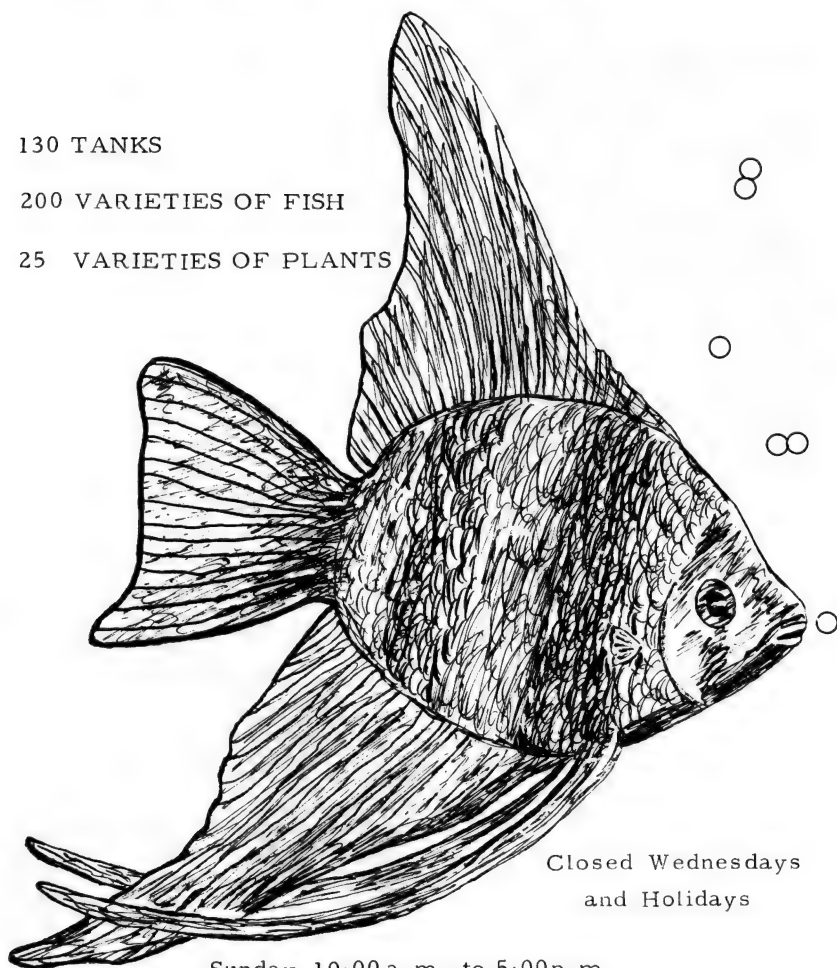
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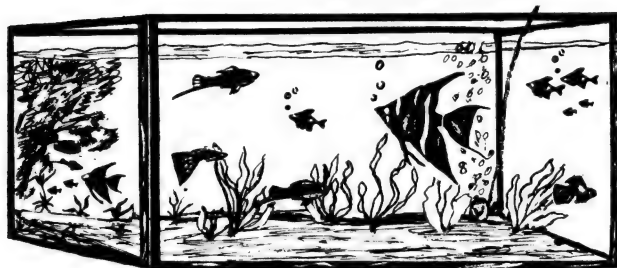
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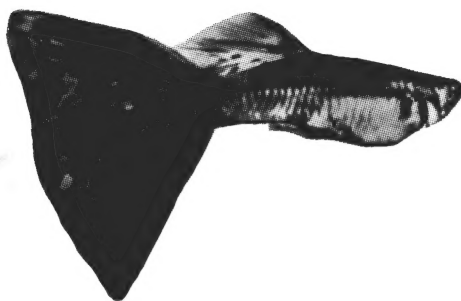
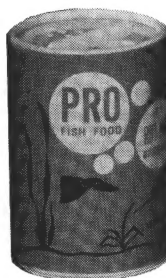
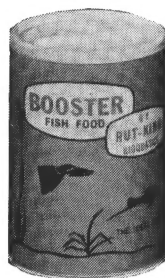
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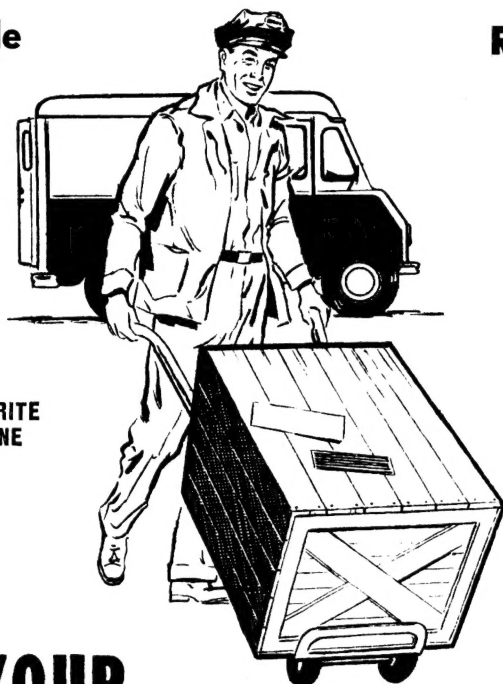
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